Payout Policy Choices and Shareholder Investment Horizons

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Abstract

This paper examines how shareholder investment horizons influence payout policy choices. We infer institutional shareholders' investment horizons using the churn rate of their overall stock portfolios prior to the payout decision. We find that the frequency and amount of repurchases increases with ownership by short-term investors, to the detriment of dividends. We also find that the market reacts less positively to repurchase announcements made by firms held by short-term institutions. These findings are consistent with a model in which undervalued firms signal their value through repurchases, but firms held by short-term investors make repurchases more often because those investors care mostly about the short-term price reaction. Hence the market rationally discounts the signal provided by such repurchases. Our findings suggest that shorter shareholder investment horizons might be one contributing factor to the increasing popularity of buybacks.

JEL Classification: G35; G32
Keywords: payout policy; repurchases; institutional investors; investment horizon; shareholder heterogeneity.

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Abstract

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1. Introduction

Over the last three decades, share repurchase activity has experienced extraordinary growth. Repurchases are now an important form of payout of U.S. firms, and the long-term trend in payout choices points toward a lower proportion of firms paying dividends and replacing them with repurchases (Fama and French, 2001; Grullon and Michaely, 2002; Julio and Ikenberry, 2004). These major shifts in payout policy occurred concurrently with the rise of institutional ownership. The percentage of equity ownership held by institutional investors now represents over 70% of firm's total equity, up from 24% in 1980 (Gompers and Metrick, 2001; Gillan and Starks, 2007).

Institutional investors are far from an homogeneous group (e.g. Hotchkiss and Strickland, 2003). In particular, money managers differ in terms of their investment horizon, that is, the expected length of time that an investor holds a stock in his portfolio. Some institutions have a short-term focus, acting as "speculators", while others are more long-term oriented, behaving as "activists" (Gillan and Starks, 2007). Moreover, the average investment horizon has changed over time. For example, Bogle (2003) reports that mutual fund managers currently hold a stock in their portfolio for an average holding period of approximately one year, versus six years in the early 1970s.[1]

This paper studies how the investment horizon of a firm's shareholders affects the choice of payout method. Our testable hypotheses are based on a signaling model of the payout choice by Lucas and McDonald (1998). Although the evidence on the empirical performance of signaling models is mixed (see Allen and Michaely (2003) for a critical review), the model has the advantage of offering clear-cut predictions of the impact of shareholder investment horizons on payout choices.[2]

In Lucas and McDonald (1998), privately-informed managers (whose interests are aligned with shareholders) must decide how to distribute excess cash.[3] Investors update their beliefs about the value of assets in place by observing the firm's payout decision, i.e. the proportion of the cash paid through a dividend or a repurchase. The authors show that managers deciding which payout mechanism to use face two opposite forces. On the one hand, paying cash through a dividend is costly because dividend income tax rates are assumed to be higher than capital gains tax rates. On the other hand, paying cash through a repurchase might generate a wealth transfer to selling shareholders from non-selling shareholders (that stay with the firm after the buyback) if the repurchase price is too high. Managers must therefore trade-off the tax cost of a dividend against the potential dilution cost of a repurchase.

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[1] The short-term nature of institutional investors is stressed in Stein (1989), Porter (1992), and Froot, Perold and Stein (1992).

[2] Other signaling models of the choice between dividends and repurchases include Ofer and Thakor (1987) and Brennan and Thakor (1990). In Chowdry and Nanda (1994), firms can also choose to store cash.

[3] The amount of cash to be distributed, left-over after all positive NPV opportunities are exhausted, is common knowledge. This motivates our choice to look at firms with positive payouts in our tests (see below).

Lucas and McDonald (1998) show that a signaling equilibrium exists in which relatively more undervalued firms signal their value to the market by paying a larger proportion of their cash through repurchases. This equilibrium is supported as follows. In the absence of taxes an overvalued firm with only long-term shareholders will never repurchase its own shares (since managers always act in the shareholders' best interest). The market thus interprets a repurchase unambiguously as good news, bidding the firm's price up. In the presence of taxes the firms will separate. High quality firms choose to repurchase relatively more because their potential dilution costs are much smaller. Low quality firms pay costly dividends but doing so saves them an even larger dilution cost. Hence along the equilibrium schedule the market increases its estimate of the firm's value in direct relation with the amount of repurchases.

The model's main insight of interest to us is that the trade-off faced by managers depends on the investment horizon of shareholders. Non-selling (long-term) shareholders face the dilution cost described earlier. Selling (short-term) shareholders benefit from the non-negative price reaction to a repurchase announcement and save on taxes, so they unambiguously prefer managers to make a repurchase.[4] Managers, who decide on the payout choice, are assumed to act according to the preferences of the shareholders. As the fraction of ownership by short-term shareholders increases, the weight of the dilution costs (borne by long-term shareholders) in the manager's utility function decreases, and managers optimally choose to perform a larger amount of repurchases. However the market recognizes such repurchases as a less credible signal of firm undervaluation, and attributes a proportionally lower valuation increase (given a similar-sized repurchase) to a firm dominated by short-term investors relative to a firm dominated by long-term investors.

The model thus offers testable predictions concerning the relation between shareholder investment horizons and payout choice. The first prediction is that the proportion of cash paid through repurchases should be associated with shorter shareholder investment horizons. The second prediction is that the likelihood of using repurchases should be positively associated with shorter shareholder investment horizons. The third prediction is that the market reaction to a repurchase announcement should be negatively associated with shorter shareholder investment horizons. An additional falsification test is that these effects should be stronger for firms characterized by higher information asymmetries, because for those firms dilution costs are particularly important. As usual, our underlying null hypothesis is that in perfect capital markets investment horizon should not matter because arbitrage through "home-made dividends" makes payout policy irrelevant (Miller and Modigliani, 1961).

[4] Shareholders who participate pro-rata in the repurchase will also strictly prefer repurchases to dividends because they are indifferent to the repurchase price but prefer to save the dividend taxes. Note that, for the equilibrium to hold, the percentage of selling shareholders must be bounded from above (Lucas and McDonald, 1998).

The availability of data on institutional holdings provides an unique opportunity to infer the investment horizon of shareholders. We characterize each institutional shareholder's investment horizon by looking at the average turnover level of its portfolio, i.e. the ratio of dollar purchases and sales to the dollar value of the portfolio (Gaspar, Massa and Matos, 2005). We aggregate within each firm to get the average portfolio turnover rate of all institutional investors in each firm's ownership structure. We use this proxy, which we call Investor Turnover, to study how investment horizons affects payout policy choices and the market reaction to repurchase announcements. Besides issues of data availability, the use of institutional shareholdings to test the model can be justified on the grounds that institutions usually hold sizable stakes and are less likely to suffer from coordination problems (e.g. Shleifer and Vishny, 1986).

Our empirical analysis uses a sample of public U.S. non-financial firms with positive payouts in any given year for the period 1984 to 2008. Our results show that firms whose ownership structures are characterized by more short-term oriented investors use a higher proportion of repurchases in their payouts. If institutional investors hold on to their investments for 5 months less than the average of 27 months in our sample (i.e. one standard deviation in Investor Turnover), the share of repurchases in total payout increases by 9.5% (a 26% relative increase) and the probability of the firm making a repurchase instead of augmenting the dividend is raised by 2.5% (a 5% relative increase). We also find that the market reaction to a stock repurchase announcement decreases with investors' horizons. An increase of Investor Turnover of one standard deviation reduces the cumulative abnormal return around the announcement date by 27 basis points, a 14 percent change relative to the average 2.0% gain in our sample of repurchase announcements. Firms characterized by stronger information asymmetry (larger analyst forecast errors and larger analyst forecast dispersion) exhibit stronger patterns. Our results still hold when we look at the level (rather than the composition) of payout, and when we adjust our estimates for potential self-selection issues. Using a dynamic panel data estimator, we also find that reverse causality does not seem to be driving our results.

Although our analysis focuses on firms that make distributions, in the last section of the paper we offer some results for the extended sample that includes non-paying firms. We find that the presence of short-term investors is associated with making a repurchase, unconditionally in any given year or for the first time in the firm's history. At the same time, ownership by short-term shareholders decreases the probability of a dividend payment. In contrast, long-term investors are associated with positive payouts, both in the form of repurchases and dividends (though more strongly in the case of dividends). This is consistent with the notion that long-term investors have monitoring abilities and lead firms to increase payouts, irrespective of the form that these distributions take.

Our paper contributes to the growing literature on the impact of shareholder investment horizons on corporate policy and more directly on the relation between institutional ownership and dividend policy.[5,6] We show that investment horizon is a relevant dimension of shareholder heterogeneity with implications for payout policy. Our results therefore qualify and complement those of Grinstein and Michaely (2005), whose tests involving the level of institutional ownership fail to report a significant impact of ownership structure on payout patterns. Finally, our findings suggest that shorter shareholder investment horizons might be one contributing factor to the long-term trend of an increasing use of share repurchases by U.S. corporations, to the detriment of dividends (Fama and French, 2001; Grullon and Michaely, 2002).

A paper close to ours is Hovamakian and Li (2010), who report that ownership by long-term investors is associated with higher payouts, while for payers there is a strong association between on one hand, short-term investors and repurchases, and, on the other hand, long-term investors and dividends. The authors interpret their findings as consistent with monitoring by long-term investors and with the notion that short-term investors are better informed and thus prefer that firms make repurchases (Brennan and Thakor, 1990). Although most of our results concur, our paper differs from theirs by including the analyses of the market reaction to repurchase announcements and of the existence of reverse causality. We also interpret the results differently, as it will be argued in the discussion section.

Our paper takes the variation in shareholders' investment horizons as exogenous. We are agnostic concerning the reasons why investors have heterogeneous holding horizons, which include: differences in the demographics and liquidity needs of the final owners of the institutional portfolios (Edelen, 1999); the distorted incentives induced by delegated asset management (Scharfstein and Stein, 1990; Allen and Gorton, 1993; Dow and Gorton, 1997; Goldman and Slezak, 2003); the inability to continuously gather fresh capital to implement long-term strategies (Shleifer and Vishny, 1997); or variations in risk-aversion of agents trying to trade on long-term information (Holden and Subrahmanyam, 1996).

The remainder of the paper is organized as follows. Section 2 describes the data and the methodology we use. Section 3 analyzes the impact of investment horizons on the choice of payout

[5] Ownership by short-term oriented institutions has been linked to R&D cuts when earnings fall (Bushee, 1998), higher stock price volatility (Bushee and Noe, 2000), greater stock liquidity (Bushee, 2001), less frequent but higher-quality merger and acquisitions (Gaspar, Massa and Matos, 2005; Chen, Harford, and Li, 2007), lower accruals quality (Liu and Peng, 2006), lower credit ratings and higher credit spreads (Elyasiani, Jia and Mao, 2006), greater sensitivity of CEO compensation to negative performance (Shin, 2008), higher capital expenditures (Cella, 2009), higher momentum returns and subsequent returns reversal (Cremers and Pareek, 2010), and greater amplification of market-wide negative shocks (Cella, Ellul and Giannetti, 2010). Derrien, Kecskés and Thesmar (2009) argue that the impact of shareholder investment horizons is induced by market inefficiency. Yan and Zhang (2009) report that short-term investors are able to predict short-term information and profit from it through their trades.

[6] Del Guercio (1996) studies the role of dividends in institutions' portfolio selection. Hotchkiss and Lawrence (2003) provide evidence in favor of dividend clienteles within institutional investors. Grinstein and Michaely (2005) report that institutions do not seem to cause changes in payout and exhibit a preference for repurchasers among firms with positive payouts. Amihud and Li (2006) show that the declining information content of dividend announcements is linked to increased ownership by institutions.

policy and the market reaction to repurchase announcements. Section 4 presents several robustness checks. Section 5 investigates the impact of investment horizons in the sample that includes non-paying firms. Section 6 discusses our findings in the light of possible alternative explanations. A brief conclusion follows.

2. Data And Empirical Testing Issues

2.1. Sample Construction

Our main data source is the CRSP-COMPUSTAT Merged database containing firm-level annual data on dollar payouts for US listed firms during the period 1984-2008. We exclude regulated utilities, financial firms, and securities other than common stock. Following Ikenberry, Lakonishok and Vermaelen (1995) and Grullon and Michaely (2002), we exclude the year 1987 due to the exceptional nature of the repurchases made after the crash of October 1987. We require that firms report a positive payout, that is, a dividend, a repurchase, or both.

We extract announcement dates for open market repurchase programs from the Securities Data Corporation (SDC) database. Following Jagannathan et al. (2000), we use this information to adjust the COMPUSTAT dollar amount of repurchases by keeping repurchase values only for those years in which there is an announcement in SDC in that year or in one of the previous two years (we also exclude announcements made in the last quarter of 1987). From the CRSP Monthly Stocks event file of dividend announcements, we keep all events with CRSP declaration codes equal to 1232 (ordinary quarterly dividends) with non-missing declaration dates. Following Amihud and Li (2006), we take only those firms with dividend increases where the change in the dividend per share amount is at least 0.5%. Moreover, we require that, for each firm-year, we have data on all our main explanatory variables.

2.2. Measuring Shareholders' Investment Horizons

Information on portfolio holdings of institutional investors is available from the ThomsonReuters Spectrum 13F database, which consists of quarterly holdings filings of qualified money managers to the Securities and Exchange Commission (e.g. Gompers and Metrick, 2001). The dataset contains the positions of more than 10,000 shares or US$200,000 in value of all institutions with more than US$100 million dollars under discretionary management.

Our main variable of interest is Investor Turnover, a measure of the investment horizon of institutions holding a stake in the firm prior to a distribution announcement (Gaspar, Massa and Matos, 2005). The rationale behind this measure is that an investor can be considered short-term if it churns its overall portfolio frequently. Inversely, an investor can be considered long-term if it holds its stock positions unchanged for a considerable length of time. Having characterized each investor with positive holdings within a firm's shareholding structure, we can then characterize firms based on their average shareholder profile in terms of investment horizon prior to the payout.

To calculate Investor Turnover we use the following procedure. Denote by Q_t the set of companies held by investor i at time t. The turnover rate of investor i at time t is

$$TR_{i,t} = \frac{\sum_{k=1}^{Q_t} \left| N_{k,i,t} P_{k,t} - N_{k,i,t-1} P_{k,t-1} - N_{k,i,t-1} \Delta P_{k,t} \right|}{\sum_{k=1}^{Q_t} \frac{N_{k,i,t} P_{k,t} + N_{k,i,t-1} P_{k,t-1}}{2}} \quad (1)$$

where $P_{k,t}$ and $N_{k,i,t}$ represent the price and the number of shares, respectively, of company k held by institutional investor i at quarter t. This definition follows the ones commonly used to assess overall portfolio rotation of mutual funds (e.g. Carhart, 1997).[7] The turnover rates obtained from (1) are then averaged over the previous 4 quarters to provide us with a more stable and precise identification of which investors persistently churn their portfolios. Finally we define Investor Turnover for company k as the weighted average of the (time-averaged) turnover rates of all its institutional investors:

$$\text{Investor Turnover}_{k,t} = \sum_{i \in S_{k,t}} w_{k,i,t} \left(\frac{1}{4} \sum_{r=1}^{4} TR_{i,t-r-1} \right) \quad (2)$$

where $S_{k,t}$ is the set of shareholders in company k at time t, and $w_{k,i,t}$ is the weight of investor i in the total percentage held by institutional investors at quarter t in company k. It is important to note that Investor Turnover is based on the overall portfolio behavior of investors in firm k, and not on turnover at the level of the stock of the company involved in a distribution event. This makes it less likely to be contaminated by information-based trading due to an approaching distribution announcement. Furthermore, in our tests Investor Turnover (as well as all other independent variables) are lagged one period, further ensuring that Investor Turnover is predetermined with respect to the event.[8] To supplement our tests, we also compute the fraction of a firm's shares held by High (Mid/Low) Turnover investors as the sum of holdings held by investors in the top (middle/bottom) 33rd percentile of the time averaged turnover rates (the expression inside the parentheses in equation 2) in every year.

[7] By construction the range of the Investor Turnover variable is the interval [0,2]. When performing this calculation, we exclude throughout the sample investors who enter the 13F universe for the first time in the quarter (for they would automatically have a maximum turnover rate of 2). We also exclude from the procedure any stock of a company that has just entered the sample for exactly the same reason.

[8] We also check whether firms exhibit time-series changes in Investor Turnover in the quarters surrounding changes in payout policy announcements and find no evidence of investor pre-positioning prior to an announcement.

2.3. Control variables

Data on accounting variables is obtained from COMPUSTAT (please refer to the Appendix A for definitions and details on variable construction). The set of control variables that we use follows closely the one employed by Jagannathan et al. (2000). We use the log of firm assets, the Market-to-Book ratio, and the Debt-to-Equity ratio to control for firm size, value, and leverage. We include operating income, non-operating income, and the standard deviation of operating income to control for the impact of the 'permanence' of cash-flows on the form-of-payout decision (e.g. Guay and Harford, 2000). We include the Prior Payout ratio (average ratio of dividends to net income in the past three years) because Jagannathan et al. (2000) find that past payers are more likely to maintain and/or increase dividends (instead of making repurchases) due to possible dividend ‘stickiness’ and tax-clientele effects. We measure the liquidity of the firms' assets as the difference between current assets and current liabilities normalized by total assets. To reduce noise, our accounting variables are equal-weighted moving averages constructed from the values of the variables in the past three years.[9]

We gather data on stock market-related variables from CRSP. We compute the last 12 months' stock return to control for the impact of recent run-ups in the decision to payout. We use two measures to control for individual stock liquidity, because the latter has been found to influence the decision to repurchase (e.g. Brockman, Howe, and Mortal, 2008) and one possible criticism of the Investor Turnover measure is that it might be correlated with liquidity.[10] The first measure is the share turnover of the past year, defined as yearly trading volume divided by the number of shares outstanding. The second measure is Amihud's (2002) Illiquidity ratio, the yearly average of the daily ratio between a stock’s absolute return and its dollar volume. Finally, we use as proxy for information asymmetry the number of analysts from I/B/E/S.

We extend this basic set of control variables by adding other important controls in some of our regression specifications. We compute from ExecuComp the average level of managerial ownership and the average percentage of executive compensation paid in the form of options, to control for the influence of compensation in payout choices (e.g. Dittmar, 2000; Fenn and Liang, 2001; Kahle, 2002). Finally, we include the GIM Governance Index of Gompers, Ishii and Metrick (2003) to control for the influence of governance in the payout decision.

[9] The standard deviation of operating income is calculated using the previous 5 years of data.

[10] Note that this concern is minimized by the fact that the definition of Investor Turnover for firm *k* is calculated using the turnover rate on all stock holdings of each investor, not the turnover of their holdings in firm *k*.

2.4. Summary Statistics

Panel A of Table 1 presents the main characteristics of our firm-level panel. Our sample contains 25,197 firm-year observations. The average firm pays out 96 million dollars (M USD) in either dividends or repurchases, but the distribution of payout is substantially skewed (DeAngelo, DeAngelo and Skinner, 2004). The median firm pays 5M USD in dividends per year and there is no repurchase activity reported in slightly less than half of firm-years. The average share of repurchases in total payout is 36% and slightly higher for firms increasing their payout (48%).

All remaining variables are lagged one period with respect to the payout measures. Concerning institutional ownership, Table 1 shows that in our sample institutions hold on average 51% of the firm's shares. The average Investor Turnover is 0.22, which means that around 0.22/2=11% of the portfolio is turned over in a quarter, or around 44% of the position is turned over in a given year.[11] One equivalent way to put it is that the institutional investors are holding an average stock in their portfolio for a period of around 12/0.44=27 months. Short-term investors (that is, investors in the top third in terms of turnover rates in a given year) hold about 9% of the firm, while long-term investors hold about 23% of the firm on average. The statistics for our accounting variables are comparable with the summary statistics reported in Jagannathan et al. (2000). The average (log) firm size is 6.2, corresponding to about 495 million dollars in assets. The median firm has operating margins of 15% of assets and a Market-to-Book ratio multiple of 2.2. Managers of firms in our sample own 4% of the firm and the average firm has a score of 9 in the GIM index of governance. Note that the number of observations of our extended specification is lower because executive compensation data is only available after 1992 and the governance index is only available for a limited number of firms.

Panel B of Table 1 presents summary statistics at the event level for firms with repurchase announcements and dividend increase announcements. In addition to the variables described earlier, we calculate the Cumulative Abnormal Return (CAR) for the daily window (-1, +1) around each event date and a proxy for the size of a repurchase based on the number of shares sought in the transaction.[12] Panel B of Table 1 reports that the average CAR for repurchasing firms is 2%, and that firms intend to acquire 6.8% of their shares on average.

To better understand the differences between firms engaging in share repurchases and firms announcing an increase in dividends, Panel B of Table 1 shows means and medians of all the variables separately for the two sets of firms. "Significance stars" for the t-test (rank sum test) of equality of means (medians) are also presented. All the control variables are lagged one year with respect to the payout announcement date. The table shows that, relative to firms announcing an increase in dividend,

[11] Recall that Investor Turnover takes values in the interval [0,2]. Spectrum has a quarterly frequency and the estimates of turnover are naturally lower than those that would have been obtained if we had had data at a higher frequency.

[12] When SDC does not contain data on the number of shares sought in the repurchase, we estimate it using the actual repurchase amount reported in CRSP in a year and the average share price during the year.

repurchasing firms have higher Investor Turnover and smaller size, higher Market-to-Book ratios, lower operating margins, higher operating income volatility, and lower recent stock market performance. Repurchasing firms also have higher share turnover but also higher average illiquidity. This evidence is consistent with the findings of previous literature and indicates the importance of controlling for all these characteristics in the regression analysis.

3. Shareholder Investment Horizons and Payout Policy

3.1. Investor Turnover and the Share of Repurchases in Payout

We start by looking at the relation between shareholder investment horizons and the use of repurchases as a fraction of firms' total payout. The dependent variable is left- and right-censored at 0 and 1, respectively. For that reason we estimate a Tobit model (dropping firm subscripts for clarity)

$$y_{1,t}^{*} = \alpha_1 + \beta_1 \times \text{Investor Turnover}_{t\text{-}1} + \gamma_1 \mathbf{X}_{t\text{-}1} + \varepsilon_t \qquad (3)$$

$$y_{1,t} = \begin{cases} 0 & \text{if } y_{1,t}^{*} \leq 0 \\ y_{1,t}^{*} & \text{if } 0 > y_{1,t}^{*} > 1 \\ 1 & \text{if } y_{1,t}^{*} \geq 1 \end{cases}$$

where y_1, the dependent variable, is the observed share of repurchases in payout and $\mathbf{X}$ is a matrix containing the control variables described in section 2.3.

Table 2 presents the estimation results. In Panel A, the dependent variable is the Share of Repurchases in Total Payout across all paying firms. In Panel B, the dependent variable is the ratio of Repurchase in Payout-Increasing Firms, in which, as the name indicates, we restrict ourselves to firms that perform either a repurchase or a dividend increase in a given year, in the spirit of Guay and Harford (2000). Results are very similar in the two cases, so we comment mostly using the results of Panel A.

The results of our basic specification in column 1 of Table 2 show that Investor Turnover affects positively the share of repurchases (coefficient t-statistic 6.28), providing evidence that a higher proportion of short-term investors is associated with a higher use of buybacks. Results for other variables are in line with previous literature. The use of a higher fraction of repurchases is associated with smaller firms (coefficient of Size is negative with t-statistic -8.45), firms with lower Operating Income (t-stat. -5.18) and more volatile operating income (t-stat. 3.69), and with worse previous stock performance (t-stat. -5.91). The coefficient of Institutional Holdings is not statistically significant (and in general does not have a consistent sign across specifications). Finally, repurchasing firms exhibit higher trading volume (t-stat. 4.17) but Illiquidity does not seem to affect the proportion of repurchases in total payout.

Column 2 presents estimation results using the expanded set of control variables. Firms with higher Managerial Holdings repurchase relatively less (t-stat. -1.75), and firms in which executives receive more of their compensation in options repurchase relatively more (t-stat. 6.88). The latter result is consistent with findings of Fenn and Liang (2001) and Kahle (2000). Better governance also seems to be associated with more repurchases (t-stat. -3.93). This result differs from that of John and Knyazeva (2006) that report an insignificant coefficient in a similar type regression. Note also that, because of data availability for these corporate governance variables, the number of observations in this specification drops substantially relative to our basic specification.

To gauge the economic significance of our results, we note that an increase in one standard deviation of Investor Turnover (equal to 0.076 from Panel 1 of Table A) corresponds to a decrease in investment horizon of 7 months relative to the sample average of 27 months.[13] Multiplying the marginal effect of 1.261 (from column 1 of Panel A) by 0.076, we get an increase in the share of repurchases in total payout of about 9.6%. This represents an increase in the payout share of the average repurchase from 35.6% to 45.2%.

In columns 3 and 4 of Table 2, we use as main independent variable the fraction of ownership held by different types of investors classified according to their investment horizon. Recall that a High (Mid/Low) Turnover Investor is an institution on the top (mid/bottom) third in terms of overall portfolio turnover rate in a given year. The results show that the holdings of High Turnover Investors are strongly positively associated with the proportion of repurchases in total payouts (coefficient t-stat. 4.33 in column 3 of Panel A), while the holdings of Low Turnover Investors are negatively associated with repurchases (t-stat. -2.12). These results are robust across specifications in both Panel A and B. To gauge the significance of these effects, an increase of one standard deviation in IO of High Turnover Investors (0.074 from Table 1) would lead to an increase in the use of repurchases of $1.068 \times 0.074 = 7.9\%$. Simultaneously, an increase in IO of Low Turnover Investors of one standard deviation (0.15 from Table 1) would lead to a decrease in the use of repurchases of $-0.366 \times 0.15 = -5.5\%$.

3.2. An Additional Test Based on Information Asymmetry

The Lucas and McDonald (1998) (LM) model predicts that the impact of a repurchase will be stronger in situations in which the asymmetry of information between the firm and the market is high. We test this prediction by computing two proxies commonly employed to capture information asymmetry. The first is the firm-level Analyst Forecast Errors (AFE), the yearly average of the

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[13] Adding 0.076 to the sample average of Investor Turnover of Panel A of Table 1 (0.221) gives a turnover of 0.296/2 = 14.8% per quarter, or 59.2% per year. This leads to an investment horizon of 12/0.59 = 20 months.

monthly forecast error in end-of-fiscal-year earnings per share (EPS). For every month we calculate the ratio (actual EPS – average forecast EPS) / average forecast EPS and average it over the year. The second is Dispersion of Opinion (DOP), the ratio between the standard deviation of analysts' EPS forecasts and the absolute value of the average EPS forecast. Based on these variables, we create two dummy variables that take the value of 1 if a firm is above the sample median in terms of AFE or DOP in a given year, and 0 otherwise. We call these High AFE and High DOP firms, respectively. We then interact these two dummy variables with Investor Turnover and insert them in our regression specification. The coefficients of these interactions allow us to understand if there is a differential impact of Investor Turnover in firms for which asymmetric information is high. We also introduce in the specification the level of AFE and DOP to control for the level of asymmetric information surrounding the firm.

The results in columns 5 and 6 in Panel A of Table 2 indicate that the predictions of the LM model seem correct. Not only Investor Turnover is still positive and significant controlling for information asymmetry, but the interaction terms Investor Turnover × High AFE and Investor Turnover × High DOP are positive and statistically significant (t-stat 1.73 and 1.98, respectively). The results are stronger in Panel B, for the set of payout-increasing firms, with larger coefficients and stronger t-statistics (t-stat 3.48 and 2.70). Of the two proxies for asymmetric information, only DOP is positive and significant at the 10% level. We conclude that the evidence is in favor of our working hypothesis.

3.3. Investor Turnover and the Repurchase vs. Dividend Decision

This section focuses on the relation between shareholder investment horizons and the decision by firms to make a repurchase or increase their dividend payout. We estimate a Probit regression

$$y^*_{2,t} = \alpha_2 + \beta_2 \times \text{Investor Turnover}_{t\text{-}1} + \gamma_2 \mathbf{X}_{t-1} + \varepsilon_t \quad (4)$$

$$y_{2,t} = \begin{cases} 0 \text{ if } y^*_{2,t} \leq 0 \\ 1 \text{ if } y^*_{2,t} > 0 \end{cases}$$

where y_2, the dependent variable, is an indicator variable that takes the value 1 if a firm makes an open market repurchase announcement and 0 if the firm announces an increase in dividends. **X** is again the matrix of control variables described in section 2.3.

Column 1 of Table 3 presents the results of estimating the Probit model under our basic specification. The coefficient of Investor Turnover is positive and highly significant (t-stat. 5.34). This suggests that firms held by short-term investors are more likely to choose to repurchase shares rather than a dividend increase when deciding how to distribute cash. The marginal effect of Investor

Turnover is 0.339 (not shown in the table), implying that an increase of one standard deviation in Investor Turnover represents an increase in the probability of a repurchase of around 0.339 × 0.076 = 2.6%.[14] This is a 5.6 percent increase relative to the unconditional mean likelihood of a repurchase (equal to 8,104/17,604 = 46% from Table 1). The estimates in column 2 that control for executive compensation characteristics and firm governance yield similar results.

Columns 3 and 4 of Table 3 show that IO of High Investor Turnover has a positive and significant loading (t-stat. 5.45), and IO of Low Investor Turnover has a negative and significant loading (t-stat. 2.48). In terms of marginal effects (not shown in the table), the two variables mentioned have derivatives of 0.33 and -0.12 respectively. This implies that an increase of one standard deviation in IO of High Turnover Investors leads to an increase in the probability of repurchases by 0.33 × 0.074 = 2.4%. Simultaneously, a increase in IO of Low Turnover Investors of one standard deviation (0.15 from Table 1) would lead to a decrease in the use of repurchases by -0.12 × 0.15 = -1.8%. The coefficients of the other explanatory variables are in line with previous literature. The probability of a repurchase is negatively associated with firm size, albeit not in every specification. Variables reporting consistently significant results across all specifications are Operating Income (negative correlation with choosing a repurchase), Standard Deviation of Operating Income (positive correlation with choosing a repurchase), Last 12 Month Return (negative correlation), and Last 12 Month Share Turnover (positive correlation).

Finally, columns 5 and 6 repeat the test suggested in section 3.2 by including interaction terms between Investor Turnover and proxies that capture high information asymmetry. We find that these interactions are positive and statistically significant (t-stat. 3.52 in the case of Investor Turnover × High AFE and t-stat. 4.63 in the case of Investor Turnover × High DOP). Hence the impact of Investor Turnover on the payout decision is stronger for firms characterized by stronger information asymmetry.

3.4. Shareholder Investment Horizons and the Market Reaction to Repurchase Announcements

The final testable prediction concerns the relation between Investor Turnover and the market's reaction to repurchase program announcements. We adopt a cross-sectional event-study framework and run the following regression model

$$\text{CAR}_t = \alpha_3 + \beta_3 \times \text{Investor Turnover}_{t\text{-}1} + \gamma_3 \mathbf{X}_{t-1} + \varepsilon_t \qquad (5)$$

[14] All marginal effects in this paper are evaluated using the sample average of the individual marginal effects.

where the dependent variable is the cumulative abnormal return over the daily window (-1, +1) around the announcement of an open market repurchase. **X**, the matrix of control variables, is similar to the one employed in previous specifications plus the size of the share repurchase as an additional control.

The results are reported in Table 4. Column 1 shows that the coefficient of Investor Turnover is negative and statistically significant (coefficient -0.037, t-stat. -2.29). In terms of economic significance, an increase of investor turnover of one standard deviation reduces the abnormal return by $-0.037 \times 0.076 = -0.28\%$, a decrease of 14 percent relative to the sample average of 2.0% cumulative abnormal return. This result is robust across the different specifications reported in the table. Columns 3 and 4 show that the effect of Investor Turnover seems mostly concentrated in the set of investors with particularly High Turnover. The coefficient of IO of High Turnover Investors is negative and strongly significant (coefficient -0.055, t-stat. -4.84). A change of one standard deviation in the ownership by these investors reduces the abnormal return by $-0.055 \times 0.074 = -0.40\%$, or 20 percent relative to the sample average CAR.

Regarding the other variables of interest, Size of Repurchase is strongly positive and statistically significant across all specifications. The coefficient on Institutional Ownership is negative and statistically significant in all but one model. This result confirms the evidence of Amihud and Li (2006) who find that higher institutional ownership seems to be associated with lower signaling power of payout policy announcements. Other variables that have significant results in most specifications include Size (negative correlation with abnormal announcement returns), prior stock returns (negative correlation) and Illiquidity (positive correlation).

Finally, columns 5 and 6 present results conditioning on the level of information asymmetry. The coefficient estimates of the interaction terms Investor Turnover × High AFE and Investor Turnover × High DOP are positive and statistically significant. Taking the first of the interactions as an example, the results in column 5 show that the effect of Investor Turnover on returns is dampened by about 40% relative to the point estimate of Investor Turnover alone (0.021/0.052). A high amount of uncertainty surrounding the firm makes the market adjust its valuation by relatively more, conditional on the horizon of the firm's investors. This is what the Lucas and McDonald model would predict. Surprisingly the results show that the level of asymmetric information (that is, the level of AFE and the level of DOP) does not seem to matter. However the strong statistical significance of Illiquidity might mean that this variable is picking up the level of adverse selection implicit in stock prices.

4. Robustness Checks

4.1. Investment Horizons and the Absolute Level of Payout

Our first robustness check addresses the issue of whether our findings hold for the level (and not only the proportion) of repurchases. We estimate an OLS regression of the level of both repurchases and dividends on Investor Turnover and our set **X** of control variables:

$$y_{4,\mathrm{t}} = \alpha_4 + \beta_4 \times \mathrm{Inv.Turnover}_{t\text{-}1} + \gamma_4 \mathbf{X}_{t-1} + \varepsilon_t \quad (6)$$

In our implementation of y_4 we take logarithms of the levels of payout to accommodate the skewness exhibited by these variables and discussed in section 2.4.

Table 5 presents the results. In columns 1 to 3, the dependent variable is the log of (1 + Repurchases Amount). The results show that Investor Turnover is positive and statistically significant (coefficient 0.316, t-stat. 2.21). The estimate in the extended specification is larger, but of similar statistical significance (coefficient 1.054, t-stat. 2.00). Finally, the impact of the fraction of shares held by High Turnover Investors is positive and significant at the 10% level (coefficient 0.680, t-stat. 1.72).

These results are in contrast with those of columns 4 to 6, in which the dependent variable is the log of (1 + Dividend Amount). The coefficients of Investor Turnover are negative and strongly significant (coefficient -0.884, t-stat. -7.82 in the basic specification). Column 6 shows that the presence of High Turnover and Mid Turnover investors is negatively associated with dividend payouts but the presence of Low Turnover investors is associated with larger dividend payouts (coefficient 0.504, t-stat. 2.20). We conclude that the investment horizon of shareholders affects payouts in the direction predicted by our hypothesis.

4.2. Causality Analysis

One concern regarding the results in section 3 is that causality might run from payout policy to shareholder investment horizon if repurchasing firms attract short-term investors and dividend-paying firms attract long-term investors. Allen, Bernardo, and Welch (2000) propose a model in which firms use dividends to attract a clientele of institutions that can effectively monitor them, a property which has been associated with long-term investors (Gaspar, Massa and Matos, 2005; Chen, Harford and Li, 2007).

To address this issue, we run a test of causality between the choice of payout policy (Share of Repurchase to Total Payout) and Investor Turnover. We estimate the following panel vector-autoregressive model (e.g. Holtz-Eakin, Newey, and Rosen, 1988)

$$\mathrm{SR}_{i,t} = \alpha_5 + \phi_5 \mathrm{SR}_{i,t-1} + \beta_5 \mathrm{IT}_{i,t-1} + \gamma_5 \mathbf{X}_{i,t-1} + \upsilon_{5i} + \varepsilon_{5i,t} \quad (7)$$

$$\mathrm{IT}_{i,t} = \alpha_6 + \phi_6 \mathrm{IT}_{i,t-1} + \beta_6 \mathrm{SR}_{i,t-1} + \gamma_6 \mathbf{X}_{i,t-1} + \upsilon_{6i} + \varepsilon_{6i,t} \quad (8)$$

where $\mathrm{SR}_{i,t}$ denotes Share of Repurchases, $\mathrm{IT}_{i,t}$ denotes Investor Turnover, $\mathbf{X}_{i,t}$ is a matrix of control variables, the υ_i represent firm-specific effects, $\varepsilon_{i,t}$ represent serially uncorrelated idiosyncratic errors, and indices $i = \{1,..., N\}$, $t = \{1,..., T_i\}$ represent firms and years, respectively. The specification assumes that the dynamics of the endogenous variables are such that it takes no more than one year for the past values of endogenous variables to affect their future values. This modeling choice is based on the results of Grinstein and Michaely (2005), who, in their analysis of the dynamic relation between institutional ownership and payout policy, report that a lag of one period seems to better fit the data.

We use first differences to eliminate the firm-specific effect (whose correlation with the lagged dependent variable renders least-squares estimation inconsistent), obtaining

$$\Delta\mathrm{SR}_{i,t} = \phi_5 \Delta\mathrm{SR}_{i,t-1} + \beta_5 \Delta\mathrm{IT}_{i,t-1} + \gamma_5 \Delta\mathbf{X}_{i,t-1} + \Delta\varepsilon_{5i,t} \quad (9)$$

$$\Delta\mathrm{IT}_{i,t} = \phi_6 \Delta\mathrm{IT}_{i,t-1} + \beta_6 \Delta\mathrm{SR}_{i,t-1} + \gamma_6 \Delta\mathbf{X}_{i,t-1} + \Delta\varepsilon_{6i,t} \quad (10)$$

Each equation is estimated individually using a generalized-method-of-moments (GMM) dynamic panel data estimator to accommodate the correlation between the first-differenced errors and the lagged differences of the endogenous variable implicit in (9)-(10). The first two observations for each firm in the panel are lost to lags and differencing. Arellano and Bond (1991) use the lagged levels of the endogenous variables to obtain the moment conditions

$$E\left(SR_{i,t-s}\Delta\varepsilon_{i,t}\right) = E\left(IT_{i,t-s}\Delta\varepsilon_{i,t}\right) = 0 \quad \forall i,\ t = 3,...,T_i,\ 2 \le s \le t-1. \quad (11)$$

The number of moment conditions implied by (11) can be very large. In our empirical implementation we limit ourselves to the second, third, and fourth lag ($2 \le s \le t-1 \le 4$) of the endogenous variables. In addition, the instrument matrix implied by (11) suffers from a weak instrument problem if the autoregressive parameter ϕ is close to one, i.e. if the dependent variable exhibits severe persistence (Blundell and Bond, 1998; Blundell, Bond and Windmeier, 2000). The Blundell and Bond estimator therefore adds to the instrument matrix moment conditions that utilize the lagged differences of the endogenous variables of the equation in levels:

$$E\left(\Delta SR_{i,t-1}\varepsilon_{i,t}\right) = E\left(\Delta IT_{i,t-1}\varepsilon_{i,t}\right) = 0 \quad \forall i,\ t = 3,...,T_i\,. \quad (12)$$

Moment conditions (11) and (12) are enough to identify the parameters of interest ϕ and β. Full details about the estimation procedure can be found in Appendix B.

Table 6 presents our results focusing only on the parameter estimates of the endogenous variables. The table also reports two diagnostic tests. First, we test if the differenced residuals are first-order negatively autocorrelated and second-order serially uncorrelated, as required by the assumptions of the GMM estimator (e.g. Arellano and Bond, 1991; the table shows the p-value of the latter test). Second, the Sargan test of over-identifying restrictions is reported along with our results to ensure that the instruments are appropriately chosen. In Panel A the endogenous variable related to repurchases is the Share of Repurchases in Total Payout, while in Panel B it is the Share of Repurchases in Payout-Increasing Firms. In both panels the estimates in columns 1 and 2 employ our basic specification, while estimates in columns 3 and 4 employ our extended specification that includes governance and managerial ownership measures.

Results indicate that the causality runs from investor characteristics to payout policy rather than the other way around. Focusing on columns 1 and 2 of Panel A, the lagged Share of Repurchases variable is strongly statistically significant in the Share of Repurchases equation (t-stat. 11.01) and Investor Turnover is also positive and statistically significant (t-stat. 2.08). In contrast, in the Investor Turnover equation the lagged value of Investor Turnover is significant (t-stat. 1.83) but not the lagged value of the payout policy variable (t-stat. 0.22). Panel B reports similar estimates in the set of payout-increasing firms. These results support the interpretation that investment horizons affect the relative use of buybacks or dividends but not the opposite.[15]

4.3. Sample Selection Issues

The hypotheses derived from the Lucas and McDonald (1998) model apply to the sample of firms with positive payout, for which the main decision is how to distribute cash to shareholders. Our focus on this sample raises the question of a possible sample selection problem. If Investor Turnover affects the likelihood of firms making distributions to shareholders in the first place, the estimates presented so far might suffer from sample selection bias. We therefore replicate our results using a two-stage Heckman methodology. In this subsection we present the results of the second stage estimation (section 5 discusses the estimation results of the first-stage selection equation).

We estimate several models of the type

$$z_t^* = \alpha_7 + \beta_7 \times \text{Investor Turnover}_{t-1} + \gamma_7 \mathbf{X}_{t-1} + \delta_7 \mathbf{W}_{t-1} + \eta_t \tag{13}$$

$$y_{8,t} = \alpha_8 + \beta_8 \times \text{Investor Turnover}_{t-1} + \gamma_8 \mathbf{X}_{t-1} + \sigma_8 \lambda + \varepsilon_t \tag{14}$$

$$y_{8,t} = \begin{cases} \text{unobserved} & \text{if } z_t^* \le 0 \\ y_{8,t} & \text{if } z_t^* > 0 \end{cases}$$

[15] We also check the stability of the VAR system by computing the dominant characteristic root of the matrix of parameter estimates of the endogenous variables shown in Table 6. The modulus of all roots is less than one, indicating that the system dynamics implied by the parameter estimates is stable (e.g. Greene, 2003).

in which the dependent variable y_8 refers to the different left-hand side variables of interest analyzed in section 3. The latent variable z^* in the selection equation (13) determines whether y_8 is observed. The parameter λ in the outcome equation (14) refers to Heckman's (1979) "Lambda" that corrects for sample selection, and the standard errors of the second stage are corrected to account for the fact that λ is a generated regressor. To help towards model identification, we supplement the matrix of control variables **X** with another set of variables **W** that we postulate to be correlated with selection but not with observed outcomes. We use two variables: Sales Growth, the average of the past three years' percentage change in sales; and Log of Firm Age, the (lagged) natural logarithm of the time in years since the firm first enters the COMPUSTAT database. Our rationale is that both of these variables reflect the degree of maturity of the firm, which is an important determinant of whether the firm will initiate payouts (e.g. Grullon, Michaely and Swaminathan, 2002).

Table 7 presents the results of the second-stage outcome equation for our three main results. Columns 1 and 2 of Table 7 replicate columns 1 and 2 of Panel A of Table 2; columns 3 and 4 replicate columns 1 and 2 of Table 3; and columns 5 and 6 replicate columns 1 and 2 of Table 4. The first-stage results can be found in column 5 of Panel A of Table 8 and are described in section 5.2.

The results of columns 1 and 2 show that the coefficient of Investor Turnover is positive and significant in both specifications, although the magnitude of the coefficients is lower than in Table 2 (for example, the sample-selection adjusted estimate in the basic specification is 0.708 in column 1 of Table 7 versus 1.265 in Table 2). At least part of this decrease in magnitude is explained by the fact that we run the outcome equation as an OLS (albeit with corrected standard errors), not taking into account the censoring of the Share of Repurchases variable (an inspection of all other variables' coefficients indicates that the point estimates are uniformly lower in absolute value). Concerning other variables, Standard Deviation of Operating Income and Last 12 Month Share Turnover are strongly positively correlated with the use of repurchases. Interestingly the Size variable changes sign and the sample-selection adjusted estimate is strongly positive.

Columns 3 and 4 also support our previous findings in Table 3. The coefficient of Investor Turnover is positive and strongly statistically significant in both specifications, with somewhat larger point estimates than those of Table 3. Results for other variables are similar, apart from Last 12 Month Return which changes sign.

Finally, columns 5 and 6 also show a negative and statistically significant impact of Investor Turnover on the market's reaction to the repurchase announcement. The point estimates are slightly larger than in Table 4; as an example, the coefficient of Investor Turnover in column 5 (-0.055, t-stat. -3.86) implies a reduction of the abnormal return by $-0.055 \times 0.074 = -0.4\%$, a decrease of 20 percent relative to the sample average of 2.0% cumulative abnormal return. The results for the remaining variables are similar, with the Size of Repurchase having a strongly positive influence on the market's reaction. We conclude that our results are not driven, and are robust to, sample-selection issues.

4.4. The validity of the dividend tax-disadvantage assumption

The Lucas and McDonald (1998) signaling equilibrium relies on the dual assumption that investors are taxable and that dividends are tax-disadvantaged with respect to repurchases. Our use of institutional shareholdings to test the model raises the question of whether this is a valid assumption for this set of investors. Some institutions such as pension funds are tax-exempt and might be indifferent with respect to the form of payout (or might even prefer dividends if their corporate status allows them to capture dividend tax exemptions).

There are good reasons to believe that the assumption that investors are tax-sensitive is valid for the average institutional shareholder in our sample. The first reason is that many institutions manage both taxable and non-taxable accounts. This is the case for banks, mutual funds, and insurance companies, as well as a large fraction of investment advisers whose tax status cannot be precisely identified.[16] The second reason is that, within the set of institutional shareholders, taxable investors have probably more incentives to be vocal about their preferences on payout policy than non-taxable investors. After all, the latter are indifferent about the form of payout.[17] The third reason is that the preference for repurchases of a (partly-) taxable institution can be justified by the value of the tax-timing option provided by repurchases. The rather long duration of the average repurchase program (e.g. Stephens and Weisbach 2008; Cook Krigman and Leach 2004) provides investors with the opportunity to time their trades to minimize the total portfolio taxable capital gains.[18] In summary, we believe that the existence of differences in taxation between payout choices is a reasonable assumption for our study.

Nevertheless we follow possible falsification strategies with respect to the role of taxes in our findings. In unreported regressions we divide the sample into two time-periods based on the gap

[16] Banks, mutual funds, and insurance companies manage both taxable and non-taxable assets (e.g. Jin 2006, Desai and Jin 2011, Cohn and Sykes 2010). Cohn and Sykes (2010) report that institutional investors with an identifiable tax status hold 8% of the equity of firms in their sample, among which 3% (38%) is held by tax-sensitive investors. Given that for a comparable period institutions hold 53% of the equity of firms in our sample, this indicates that only about 15% of investors' holdings are identifiable as taxable or non-taxable. Among institutions whose tax status can be precisely identified, Jin (2006) reports that about 57% of the institutions and about 40% of their portfolio dollar value are taxable. In contrast, using the ThomsonReuters' investor typology, Chetty and Suez (2005) argue that only 15% of the dollar portfolio holdings of institutions is non-taxable.

[17] Strickland (1997) reports evidence that holdings by non-taxable investors are not systematically associated with either high or low dividend-yielding stocks, consistent with this view.

[18] Different estimates of the value of this tax-timing option have been found in the literature. Poterba (1987) states that the effective tax on repurchases is 25% of the effective tax rate on dividends. Green and Hollifield (2003) calibrate a personal-tax capital structure model and find that the option to defer capital gains reduces the effective tax rate on repurchases to 60% of the statutory rate. Chay, Choi, and Pontiff (2006) estimate that the effective rate on capital gains is 50% to 80% of the effective tax rate on dividends, the lower number applying to the current post-2003 tax rates.

between the tax rates on dividends and on repurchases (Desai and Jin, 2011). We find that Investor Turnover has always a positive statistically significant association with making repurchases, and that the parameter estimates are slightly larger in years in which the tax gap is low, in accordance with the Lucas and McDonald model predictions.[19] We also use the typology of institutions from ThomsonReuters to identify investors that might prefer dividends (i.e. insurance companies) and investors that are not subject to taxes (i.e. pension funds, endowments, foundations).[20] In unreported regressions we find that when insurance companies hold a significant fraction of the firm's equity, the impact of shareholder investment horizon on payout choice is statistically significant but lower in magnitude. This indicates that substantial holdings by dividend-preferring investors counteract the influence of short-term investors, but the effect is not very strong.[21] Large holdings by endowments, foundations and pension funds seem to play no role in moderating the relation between payout choice and investment horizon, which might be due to the fact such non-taxable investors are indifferent to the type of payout. Overall, we conclude that our results are consistent with taxes playing a role in determining payout choice through the preferences of institutional investors.

5. Evidence Including Firms with Zero Payout

5.1. Long-term investors, monitoring, and the decision to pay

Our tests focused so far within the set of firms that report positive payouts. This section extends our tests to the entire sample of COMPUSTAT firms, looking at the decision of non-regular payers to pay in a given year as well as at the decision of non-payers to initiate cash distributions. Extending the sample in this way leads us outside the Lucas and McDonald model because now the firm's decision on how to distribute cash is mingled with the decision of whether to distribute cash (in other words, the amount of distributable cash is no longer fixed in advance).

What factors would lead management to payout cash, and how could shareholder investment horizon play a role in that decision? One possibility is to introduce moral hazard and the potential monitoring role of institutional investors (Easterbrook, 1984; Jensen, 1986; Shleifer and Vishny, 1986; Zwiebel, 1996; Fluck, 1999). If long-term investors possess superior monitoring abilities (e.g. Gaspar, Massa, and Matos, 2005; Chen, Harford, and Li, 2007), then ownership by long-term investors should

[19] The model predicts that, at high tax rates, the amount of distributions made through repurchases is very large for all types, so a marginal increase in short-term investors' holdings doesn't increase repurchases by as much as in the low tax case. The model's predictions concerning the market reaction to repurchase announcements (and their relation to shareholder investment horizon) in different tax environments is ambiguous and depends on the underlying parameter values.

[20] Desai and Jin (2011) argue that the corporate form of insurance companies allows them to benefit from dividend tax deductions, subject to the caveats that they invest on behalf of both taxable and non-taxable clients and different parts of the industry (life insurance, property insurance) have different tax treatments.

[21] This result is not very surprising in the light of the findings by Barclay, Holderness and Sheehan (2011) that corporate shareholders (that presumably prefer dividends) do not seem to play a major role in determining dividend payout.

be associated with positive cash distributions (of any kind). In addition, if dividends are a stronger commitment to payout (Lintner, 1956), then we would expect ownership by monitoring long-term shareholders to be positively associated with dividends, and ownership by lenient short-term shareholders to be positively associated with repurchases. The clientele model of Allen, Bernardo, and Welch (2000) delivers a similar prediction. In their model, managers interested in keeping institutional investors with monitoring abilities pay dividends because the benefits of future monitoring (impounded in the firm's stock price) counterbalance the tax cost of dividends.

We test these predictions below by looking at the relation between the likelihood of a payout (and of a payout initiation) and shareholder investment horizon for the overall sample of firms with either positive or zero payout levels.

5.2. Likelihood of Payout

We start by estimating a Probit model of the likelihood of a payout in the set of firm-year observations that have non-missing values for all the control variables in our basic specification. The sample size roughly doubles relative to our previous tests of Tables 2 and 3. As explained in section 4.3, we add two further variables that influence the decision to initiate regular payouts: Sales Growth, the average of the past three years' percentage change in sales; and Log of Firm Age, the (lagged) natural logarithm of the time in years since the firm first enters the COMPUSTAT database.

Panel A of Table 8 presents the results. The dependent variable in column 1 and 2 is a dummy variable that takes the value of 1 if a firm performs a share repurchase in a given year, and 0 otherwise. In columns 3 and 4 the dependent variable is a dummy variable that takes the value of 1 if a firm pays a dividend, and 0 otherwise. Finally, in columns 5 and 6 the dependent variable is a dummy variable that takes the value of 1 if a firm has a positive payout, and 0 otherwise (the specification in column 5 is the first stage of the Heckman model presented in section 4.3).

Column 1 indicates that Investor Turnover is positively associated with repurchase activity (coefficient 0.243, t-stat. 2.03). The comparative statics reveal however that the effect is small: the marginal effect (not reported) is 0.062, implying that a one standard deviation increase in Investor Turnover increases the likelihood of a repurchase in the sample by 0.6% (compared to an unconditional repurchase frequency of 26%).[22] The results of column 2 for the different subsets of investors explain why this is the case. The coefficient of IO of High Turnover Investors is positive and significant, but the IO of Low Turnover Investors is also positive and significant (t-stat. 5.62). Hence both short-term and long-term investors are associated with repurchases in this sample, in contrast with our findings in Table 3.

[22] The standard deviation of Investor Turnover in this larger sample is 0.094.

With respect to dividends, column 3 shows that the loading of Investor Turnover in the likelihood of a dividend payout equation is negative and significant (t-stat. -6.88). Column 4 confirms that High Turnover Investors are negatively associated with dividend payouts (t-stat. -3.88), while the impact of IO of Low Turnover Investors is strongly positive and significant (t-stat. 5.58). Finally, column 6 indicates that ownership by Low Turnover Investors is positively associated with positive payouts of any kind (t-stat. 7.29), but the reverse is true for High Turnover Investors (t-stat. -3.58).

In summary, in the extended sample Investor Turnover is positively associated with repurchases and negatively associated with dividends, in agreement with our earlier findings. However, ownership stakes of long-term investors are associated with higher likelihoods of a non-zero distribution, independently of the form in which such distribution is made.

5.3. Payout initiation

Panel B of Table 8 repeats the same exercise but now we focus on the firm's decision whether to initiate a distribution. Columns 1 and 2 present estimation results in which the dependent variable is a dummy variable equal to 1 in the first year that a firm announces a repurchase, and 0 otherwise. In columns 3 and 4 the dependent variable is a dummy variable that takes the value of 1 in the first year that a firm announces a dividend, and 0 otherwise.[23]

The results show that Investor Turnover is positively associated with the likelihood that the firm makes a repurchase for the first time (coefficient 0.432, t-stat. 3.06). This result is due to the positive impact of the holdings of High Turnover investors (t-stat. 4.93). In contrast, columns 3 and 4 indicate that the decision to initiate a dividend seems unrelated to investor horizon. Neither Investor Turnover nor the holdings of the different investor groups are statistically significant.

Taken together, the results from this section indicate that the presence of short-term oriented investors induces firms to conduct repurchases and to initiate their payouts via a repurchase. At the same time, short-term investors are associated with lower use of dividends both for regular and non-regular payers. Ownership by long-term shareholders seems to be associated with positive payouts independently of the way non-regular payers choose to make their distributions. However they don’t seem to play a role in forcing the firm to initiate payouts, but mostly in the continuation of cash distributions once the firms starts doing so. These results are consistent with a possible monitoring role by long-term oriented shareholders, at least if one looks at the population that includes firms that are not regular payers.

[23] To estimate the repurchase or dividend initiation, we ignore the first year in which the firm enters the sample. This makes the number of observations drop slightly relative to Panel A.

6. Discussion

What other theories could potentially explain our results? This section considers possible competing explanations in the context of the existing theoretical and empirical literature. For simplicity we separate the discussion in two parts, one focusing on the results within the set of firms with positive payout (sections 3 and 4), and the other one the results in the extended sample (section 5).

6.1. Results in the sample of payers

Brennan and Thakor (1990) propose an adverse selection model in which informed investors prefer repurchases because the it gives them the opportunity to profit at the expense of uninformed investors. This theory could explain our findings for the sample of payers if we believe that informed shareholders are the ones with the shortest investment horizon. However in our view this interpretation suffers from several shortcomings. First, managers could presumably find a way to reduce information asymmetry that would not involve wealth transfers between short-term and long-term shareholders.[24] Second, it is unclear how to reconcile the superior information of short-term shareholders with the evidence concerning the monitoring role of long-term shareholders.[25] Thirdly, the Brennan and Thakor (1990) model implies that adverse selection costs should weigh on the liquidity of repurchasing firms, both ex-ante (because firms with a higher proportion of informed shareholders repurchase more often) and ex-post (because after a repurchase announcement market-maker should adjust the spread for the likelihood of informed trading). Both of these predictions are not borne out by the data.[26]

Are moral hazard theories a potential explanation? If dividends are a stronger commitment to payout cash, long-term investors with monitoring abilities could be associated with higher dividends and lenient short-term shareholders with repurchases. However in the sample of payers this explanation is not convincing. First, long-term shareholders might prefer a repurchase if the latter achieves the same goal of taking cash away from managers' hands while being more tax efficient (Nohel and Tarhan, 1998). Second, traditional agency models predict lower payouts by firms held by lenient short-term shareholders, but empirically repurchase payouts tend to be larger than equivalent dividend increases (Jagannathan et al., 2000). Third, the clientele model of Allen, Bernardo and Welch

[24] Brennan and Thakor (1990) "deliberately ignore the role of management as an informed party" in their paper (p. 995). Note that since managers rarely sell in a repurchase, they would be diluting themselves by buying back overvalued shares.

[25] See e.g. Bushee (1998), Gaspar, Massa and Matos, (2005), Chen, Harford, and Li (2007), Liu and Peng (2006), Elyasiani, Jia and Mao (2006), Shin (2008), and Cella (2009). Monitoring requires the ability to acquire information about management's actions at a lower cost. Long-term investors, having been shareholders for longer, have had more time to learn about the firm. Simultaneously they have more incentives to gather information because they will stay in the firm for longer.

[26] Brockman, Howe and Mortal (2008) find that ex-ante liquidity is positively related with the likelihood of a repurchase. The findings on ex-post liquidity are mixed. Papers reporting a negative impact of repurchases on liquidity include Barclay and Smith (1988), Brockman and Chung (2001), and Ginglinger and Hamon (2007). Papers reporting a positive impact include Miller and McConnell (1995), Grullon and Ikenberry (2000), and Chemmanur, Cheng and Zhang (2010).

(2000) predicts that the causality should run from payout policy to ownership structure, but our tests, like those of Grinstein and Michaely (2005), reject that prediction. We conclude that the agency framework does not fit well the results in the sample of payers.

6.2. Results in the extended sample including non-payers

The results in the extended sample indicate that there seem to be two effects at work. First, the findings are partly consistent with the adverse selection model of Lucas and McDonald (1998). Ownership by short-term investors has the same sign as in the results for the sample of payers, confirming the model's predictions. In contrast, ownership by long-term investors is positively associated with both dividends and repurchases, an apparent contradiction of the model. However one cannot read too much into this dichotomy. On the one hand, any signaling model of payout choice in which the amount of cash to distribute is known and fixed cannot explain the decision of whether to payout cash.[27] On the other hand, the main intuition probably remains if we try to extend the model to accommodate the possibility of zero payout. Suppose that firms could choose to store cash between periods, and not make any payout if taxes are too high or if the firm is severely overvalued.[28] The costs of dilution are always borne by long-term investors, and dilution only happens with repurchases. Hence ownership by long-term investors should be negatively and not positively associated with repurchases. Some other force is therefore at work in order for shareholder investment horizon to matter in the extended sample.

We think the most likely explanation is monitoring. The results in the extended sample address some of the criticisms made above when discussing the results on the sample of payers. We find that: long-term shareholders do force payouts through repurchases, compared to the alternative of not distributing cash; in addition, ownership by short-term (long-term) investors is negatively (positively) related to total payout, just like what traditional agency theories would predict. However monitoring cannot be the full explanation, because it is not clear why lenient short-term investors also manage to extract payouts through repurchases.

We conclude that both monitoring and adverse selection motivations for payout choice seem present in the data. These two effects however seem to apply to different stages of the payout decision, with the monitoring explanation having more traction in the decision to payout cash, and the adverse selection explanation being more compelling with respect to the decision on how to split that cash between dividends and repurchases. Future theoretical in this area should probably focus on the seemingly different nature of the two decisions.

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[27] This is the case for Brennan and Thakor (1990), Lucas and McDonald (1998), and Allen Bernardo and Welch (2000).
[28] Chowdry and Nanda (1994) offer a model along these lines.

7. Conclusion

This paper tests the hypothesis that shareholder investment horizon is an important source of investor heterogeneity when firms decide how to distribute cash to their shareholders. Using institutional ownership data, we construct proxies for investment horizons based on the frequency with which investors rotate their overall stock portfolios. The results show that firms whose ownership structures are characterized by more short-term oriented investors use a higher proportion of repurchases in their payouts, and more likely to choose a repurchase relative to a dividend increase. The market reaction to repurchase announcements by firms mostly held by short-term institutions is positive but lower than for repurchase announcements by firms mostly held by long-term investors. The evidence is consistent with investment horizon playing a role in the shift from payouts in the form of dividends to payouts in the form of repurchases (Fama and French, 2001; Grullon and Michaely, 2002).

These findings are consistent with a signaling model in which undervalued firms signal their worth to the market by making relatively more repurchases. The signaling equilibrium is parametric on the fraction of ownership held by short-term oriented shareholders. The latter benefit from the positive price reaction to a repurchase announcement and therefore put pressure on managers to distribute cash in that way. The market recognizes these incentives and attributes a lower valuation change to repurchasing firms held by short-term investors.

Although our analysis focuses on payers (the natural setting to test the model), we also perform tests in an extended sample that includes non-payers. We find that short-term investors are associated with initiating or making a repurchase, while long-term investors are associated with positive payouts independently of their form. This is consistent with the notion that long-term investors have monitoring abilities (Gaspar, Massa, and Matos, 2005; Chen, Harford and Li, 2007). We conjecture that monitoring considerations seem to play a relatively larger role in the decision to payout cash, while adverse selection considerations seem more relevant for how to divide the payout between dividends and repurchases. This is an exciting avenue for future research.

Appendix A

This appendix describes in detail the construction of the variables used in our study.

A.1 Payout variables	
Variable:	**Definition and data source:**
Repurchases Amount	Annual dollar value of repurchases from COMPUSTAT (data item PRSTKC). We retain only values for firm-years in which there is an announcement of an open market repurchase in the SDC database in the current or any of the previous two years (Jagannathan et al., 2000). We exclude the year 1987 (e.g. Ikenberry, Lakonishok and Vermaelen, 1995; Grullon and Michaely, 2002). The SDC data contains the necessary announcement dates for the announcement return regressions (we exclude the last quarter of 1987 for announcement data).
Dividends Amount	Dollar amount of dividends from Compustat (item DVC). To gather data on announcement dates corresponding to changes in dividend policy, we use the CRSP monthly files and keep all events with CRSP declaration codes equal to 1232 (ordinary quarterly dividends) with non-missing declaration dates. Following Amihud and Li (2006) we take only those dividend increases where the change in the dividend per share amount is at least 0.5%.
Total Payout	Sum of the dollar amounts of dividends and repurchases (Compustat PRSTKC+DVC).
Share of Repurchases in Total Payout	Dollar amount of repurchases divided by Total Payout.
Dividend Increase	Positive change in Dividend Amount per share times the number of shares outstanding (Compustat item CSHO).
Share of Repurchases in Payout Increasing Firms	Ratio between Repurchases Amount and the sum (Repurchases Amount + Dividend Increase).

A.2. Institutional ownership variables. Data source: ThomsonReuters Spectrum 13F database	
Variable:	**Definition:**
Investor Turnover	Investor Turnover in company k is calculated in two steps. Denoting by Q the set of companies held by investor i, the turnover rate TR of investor i at quarter t as $$TR_{i,t} = \frac{\sum_{k=1}^{Q} \left\| N_{k,i,t}P_{k,t} - N_{k,i,t-1}P_{k,t-1} - N_{k,i,t-1}\Delta P_{k,t-1} \right\|}{\sum_{k=1}^{Q} \frac{N_{k,i,t}P_{k,t} + N_{k,i,t-1}P_{k,t-1}}{2}}$$ where $P_{k,t}$ and $N_{k,i,t}$ represent the price and the number of shares, respectively, of company k held by institutional investor i at quarter t. Investor Turnover for company k is the weighted average of the average turnover rates over the previous 4 quarters of all its institutional investors: $$\text{Investor Turnover} = \sum_{i \in K} w_{k,i,t} \left(\frac{1}{4} \sum_{r=1}^{4} TR_{i,t-r-1} \right)$$ where K is the set of shareholders in company k, and $w_{k,i,t}$ is the weight of investor i in the total percentage held by institutional investors at quarter t in company k.
Institutional Ownership (IO)	Ratio of a firm's shares held by institutional investors relative to total shares outstanding.
IO of High (Mid/Low) Turnover Investor	IO of High (Mid/Low) Turnover Investors is the fraction of a firm's shares held by investors in the top (middle/bottom) 33rd percentile of the investor's turnover rates over the previous 4 quarters.

A.3. Accounting variables. Data source: Compustat. Unless otherwise stated, all variables are equal-weighted moving averages constructed from the values of the variables in the past three years.	
Variable:	**Definition and data source:**
Size	Log of total assets (Compustat item AT).
Market-to-Book Ratio	Ratio of the market value of equity at the end of the fiscal year (the product of items PRCC_F and CSHO) to book value of equity (item CEQ).
Debt-to-Equity Ratio	Ratio of long term debt (item DLTT) to the book value of equity (item CEQ).
Operating Income	Ratio of operating income (item OIBDP) to total assets (item AT) and is.
Non-Operating Income	Ratio of non-operating income (item NOPI) to total assets
Standard Deviation of Operating Income	Standard deviation of the ratio of operating income to the total assets over the past 5 years.
Prior Payout Ratio	Ratio of total dividends (item DVC) to net income available to common (item IBCOM).
Liquid assets	Current assets (item ACT) minus current liabilities (item LCT) divided by total assets (item AT).

A.4. Stock market performance variables. Data source: CRSP	
Variable:	**Definition:**
Last 12 Month Stock Return	Compounded monthly return for the previous year.
Last 12 Month Share Turnover	Sum of the trading volume over the previous year divided by the number of shares outstanding.
Illiquidity	Yearly average of the daily ratio between a stock's absolute return and its dollar volume, averaged over all days in the month with non-zero volume: $$ILLIQ_{k,s} = \frac{1}{Days_{k,s}} \sum_{d=1}^{Days_{k,s}} \frac{\lvert R_{k,s,d} \rvert}{DVol_{k,s,d}}$$ where $Days_{k,s}$ is the number of valid observation days in year s, and $R_{k,s,d}$ and $DVol_{k,s,d}$ are, respectively, the daily return and dollar volume of stock k on day d of year s. The ratio is rescaled by a factor of 10^6.

A.5. Analyst coverage variables. Data source: I/B/E/S Summary Files	
Variable:	**Definition and data source:**
Number of Analysts	Average number of analysts covering a stock during a year.
Analyst Forecast Error (AFE)	Yearly average of the monthly calculation (actual EPS – average forecast EPS) / average forecast EPS. We use forecasts for the end-of-fiscal-year earnings per share (EPS).
Dispersion of Opinion (DOP)	Ratio between the standard deviation of analysts' EPS forecasts and the absolute value of the average EPS forecast.
High AFE	Indicator variables that takes the value of 1 if the firm's AFE is above the sample median in a given year, and 0 otherwise.
High DOP	Indicator variables that takes the value of 1 if the firm's DOP is above the sample median in a given year, and 0 otherwise.

A.6. Governance variables	
Variable:	**Definition and data source:**
Managerial Holdings	Sum of the shares owned excluding options (item SHROWN_EXCL_OPTS) by the top five executives of each company divided by the number of shares outstanding (item CSHO) from COMPUSTAT's ExecuComp Database.
Manager Stock Options	Ratio of the value of option compensation (OPTION_AWARDS_BLK_VALUE) to total compensation (item TDC1) for the top five executives of each company from COMPUSTAT's ExecuComp Database.
GIM Governance Index	Gompers, Ishii and Metrick (2003) index of shareholder rights based on 24 governance factors. A higher score of the GIM index denotes lower quality of governance from the Investor Responsibility Research Center.

A.7. Announcement return variables	
Variable:	**Definition and data source:**
Cumulative Abnormal Return (CAR)	The daily window (-1, +1) is obtained from Eventus using the CRSP Value-Weighted Index excluding dividends. The parameter estimation window ranges from -110 to -11 days with a minimum of 50 days of trading required.
Repurchase Size	Repurchase Size is equal to SDC's percentage of firm's shares sought in the transaction (item PSOUGHT) if that item is not missing. Otherwise it is estimated as the ratio between the dollar repurchases (item PRSTKC) and the average stock price (item PRCC_F) over the firm's current and previous fiscal years, itself divided by the previous year's shares outstanding (item CSHO).

Appendix B

The procedure used to estimate each of equations (7) and (8) is exactly similar and can be described using only one equation. Without loss of generality, we can write the generic model to estimate as

$$y_{i,t} = \alpha + \phi\, y_{i,t\text{-}1} + \beta\, w_{\text{i,t-1}} + \gamma\, \mathbf{X}_{i,t-1} + \upsilon_i + \varepsilon_{i,t} \qquad \text{(B.1)}$$

in which $y_{i,t}$ ($y_{i,t\text{-}1}$) is the (lagged) dependent variable, $w_{i,t\text{-}1}$ is assumed to be endogenous, and $\mathbf{X}_{i,t\text{-}1}$ is a matrix of K strictly exogenous control variables. We assume the standard conditions hold:

$$E(\varepsilon_{i,t}) = E(\varepsilon_{i,t}\upsilon_{i,t}) = 0 \;\; \forall i, \;\; t = 2,...,T_i \qquad E(\varepsilon_{i,t}\varepsilon_{i,s}) = 0 \;\; \forall i, t \neq s. \qquad \text{(B.2)}$$

Least-squares estimation of (B.1) leads to biased estimates because the lagged dependent variable is correlated with the unobserved firm-specific effect. We remove υ_i using first differences to obtain

$$\Delta y_{\text{i,t}} = \phi\, \Delta y_{\text{i,t-1}} + \beta\, \Delta w_{i,t\text{-}1} + \gamma\, \Delta \mathbf{X}_{i,t-1} + \Delta\varepsilon_{i,t} \qquad \text{(B.3)}$$

The GMM estimator of Arellano and Bond (1991) uses as moment conditions the suitably lagged levels of the endogenous variables:

$$E\left(y_{i,t-s}\Delta\varepsilon_{i,t}\right)=E\left(w_{i,t-s}\Delta\varepsilon_{i,t}\right)=0\quad \forall i,\ t=3,...,T_i,\ 2\le s\le t-1 \tag{B.4}$$

subject to the initial condition

$$E\left(y_{i,1}\varepsilon_{i,t}\right)=E\left(w_{i,1}\varepsilon_{i,t}\right)=0\quad \forall i,\ t=2,...,T_i\,. \tag{B.5}$$

Blundell and Bond (1998) show that the instruments used in the Arellano and Bond estimator become uninformative if the autoregressive parameter ϕ converges to unity. They suggest using additional moment conditions given by the lagged differences of the level equation:

$$E\left(\Delta y_{i,t-1}\varepsilon_{i,t}\right)=E\left(\Delta w_{i,t-1}\varepsilon_{i,t}\right)=0\quad \forall i,\ t=3,...,T_i. \tag{B.6}$$

subject to the initial condition

$$E\left(\Delta y_{i,2}\varepsilon_{i,t}\right)=E\left(\Delta w_{i,2}\varepsilon_{i,t}\right)=0\quad \forall i,\ t=3,...,T_i. \tag{B.7}$$

Jointly, (B.4) and (B.6) are known as 'GMM-type' instruments. The lagged differences of the exogenous variables are added as 'standard' instruments for themselves:

$$E\left(\Delta x_{i,t}\Delta\varepsilon_{i,t}\right)=0\quad \forall i,\ t\,. \tag{B.8}$$

Using all available lags, the number of orthogonality restrictions implicit in (B.4), (B.6), and (B.8) is

$$2\times\sum\nolimits_{m=1}^{\tau-2}m+2\times\left(\tau-2\right)+K$$

where $\tau = \max_i\{T_i\}$. In our empirical implementation, we use the second, third, and fourth lag ($2\le s\le t-1\le 4$) of the endogenous variables when constructing the moment conditions (B.4). Hence the number of orthogonality restrictions reduces to $2\times(\tau-2)\times 3+2\times(\tau-2)+K$. These restrictions are sufficient to identify and estimate (B.3) for $T_i \ge 3$, under assumptions (B.2), (B.5) and (B.7).

The model can be rewritten for each individual i as $y_{\mathrm{i}}=\mathbf{X}_i^*\delta+\mathbf{1}\varsigma+\varepsilon_i$ where $\mathbf{X}_i^*=\left(y_{\mathrm{i,t\text{-}1}},w_{i,t\text{-}1},\mathbf{X}_{i,t-1}\right)$ is of dimension $T_i\times(K+2)$, $\mathbf{1}$ is a unit vector of dimension T_i, and $\delta=\left(\phi,\beta,\gamma\right)$ is a vector of dimension $K+2$. The corresponding equation in differences is $\Delta y_{\mathrm{i}}=\Delta\mathbf{X}_i^*\delta+\Delta\varepsilon_i$. Stacking the level and the difference equations, we define

$$\mathbf{y}_i=\begin{pmatrix}y_i\\ \Delta y_i\end{pmatrix}\qquad \mathbf{W}_i^*=\begin{pmatrix}\mathbf{X}_i^*\\ \Delta\mathbf{X}_i^*\end{pmatrix}\qquad \mathbf{Z}_i=\begin{pmatrix}\mathbf{L}_i & \mathbf{0} & \mathbf{0}\\ \mathbf{0} & \mathbf{D}_i & \mathbf{I}_i^d\end{pmatrix}$$

in which $\mathbf{L}_i$ is the matrix of GMM-type instruments for the equation in levels given by (B.6), $\mathbf{D}_i$ is the matrix of GMM-type instruments for the equation in differences given by (B.4), and $\mathbf{I}_i^{\mathrm{d}}$ is the matrix of standard instruments used in the equation in differences given by (B.8). The Blundell and Bond GMM heteroskedasticity-robust estimator is

$$\hat{\delta} = \left[\left(\sum_i \mathbf{W}_i' \mathbf{Z}_i \right) \mathbf{A} \left(\sum_i \mathbf{Z}_i' \mathbf{W}_i \right) \right]^{-1} \left(\sum_i \mathbf{W}_i' \mathbf{Z}_i \right) \mathbf{A} \left(\sum_i \mathbf{Z}_i' \mathbf{y}_i \right)$$

in which

$$\mathbf{A} = \left[\sum_i \mathbf{Z}_i' \Delta\hat{\varepsilon}_i \Delta\hat{\varepsilon}_i' \mathbf{Z}_i \right]^{-1}$$

is a weighting matrix that uses the first-step residuals $\Delta\hat{\varepsilon}_i$ from an initial consistent estimator (see Blundell, Bond and Windmeier (2000) for details).

References

Allen, F. and G. Gorton, 1993, Churning bubbles, *Review of Economic Studies* 60, 813-836.

Allen, F., A. Bernardo, and I. Welch, 2000, A Theory of Dividends Based on Tax Clienteles, *Journal of Finance* 55, 2499-2536.

Allen, F. and R. Michaely, 2003, Payout Policy, in George Constantinides, Milton Harris, René Stulz (Eds.), *Handbook of Economics of Finance*, North-Holland.

Amihud, Y., 2002, Illiquidity and stock returns: cross-section and time-series effects, *Journal of Financial Markets* 5, 31-56.

Arellano, M., and S. Bond, 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies* 58, 277–297.

Amihud, Y. and K. Li, 2006, The Declining Information Content of Dividend Announcements and the Effect of Institutional Holdings, Journal of Financial and Quantitative Analysis 41, 637-660.

Barclay M., C. Holderness and D. Sheehan, 2011, Dividends and corporate shareholders, *Review of Financial Studies*, forthcoming.

Barclay M., and C. Smith, 1988, Corporate payout policy: cash dividends versus open-market repurchases, *Journal of Financial Economics* 88, 61–82.

Blundell, R., and S. Bond, 1998, Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics* 87, 115–143.

Blundell, R., S. Bond, and F. Windmeier, 2000, Estimation in dynamic panel data models: improving on the performance of the standard GMM estimators, IFS working paper 00/12.

Bogle, J., 2003, The Mutual Fund Industry in 2003: Back to the Future, Exhibit IV in *Statement before the U.S. House of Representatives Committee on Financial Services*, 12/03/2003 (http://financialservices.house.gov/media/pdf/031203jb.pdf).

Brennan, M. and A. Thakor, 1990, Shareholder Preferences and Dividend Policy, *The Journal of Finance* 46(4), 993-1018.

Brockman, P., J. Howe, S. Mortal, 2008, Stock market liquidity and the decision to repurchase, *Journal of Corporate Finance* 14, 446-459.

Brockman P., D. Chung, 2001, Managerial timing and corporate liquidity: evidence from actual share repurchases, Journal of Financial Economics 61, 417–448.

Bushee, B., 1998, The influence of institutional investors on myopic R&D investment behavior, *The Accounting Review*, 73(3), 305-333.

Bushee, B., 2001, Do institutional investor prefer near-term earnings over long-run value?, *Contemporary Accounting Research* 18, 207-246.

Bushee B. and C. Noe, 2000, Corporate disclosure practices, institutional investors, and stock return volatility, *Journal of Accounting Research* 38, 171-202.

Carhart, M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52(1), 57-82.

Cella, C., 2009, Institutional investors and corporate investment, Indiana University working paper.

Cella, C., A. Ellul and M. Giannetti, 2010, Investors' horizons and the amplification of market shocks, Stockholm School of Economics working paper.

Chay, J. B., D. Choi, J. Pontiff, 2006, Market valuation of tax-timing options: evidence from capital gains distributions, *Journal of Finance* 61, 837-865.

Chemmanur, T., Y. Cheng and T. Zhang, 2010, Why do firms undertake accelerated share repurchase programs?, mimeo.

Chen, X, J. Harford, and K. Li, 2007, Monitoring: Which Institutions Matter?, *Journal of Financial Economics* 86, 279-305.

Chetty, R. and E. Suez, 2005, Dividend taxes and corporate behavior: evidence from the 2003 tax cut, *Quarterly Journal of Economics* 120, 791-833.

Chowdry, B. and V. Nanda, 1994, Repurchase premia as a reason for dividends: A dynamic model of corporate payout policies, *Review of Financial Studies* 7, 321-350.

Cohn, J., and S. Sikes, 2010, Capital gains tax overhang and share repurchases, mimeo.

Cook, D., Krigman, L., and C. Leach, 2004, On the timing and execution of open market repurchases, *Review of Financial Studies* 17, 463-498.

Cremers, M. and A. Pareek, 2010, Institutional investors' investment durations and stock return anomalies: momentum, reversal, accruals, share issuance and R&D Increases, working paper.

DeAngelo H., L. DeAngelo, and D. Skinner, 2004, Are dividends disappearing? Dividend concentration and the consolidation of earnings, *Journal of Financial Economics* 72, 425–456.

Del Guercio, D., 1996, The distorting effect of the prudent-man laws on institutional equity investments, *Journal of Financial Economics* 40, 31-62.

Derrien, F., A. Kecskés and D. Thesmar, 2009, Investor Horizons and Firm Policies, HEC mimeo.

Desai, M. and L. Jin, 2011, Institutional tax clienteles and payout policy, *Journal of Financial Economics* 100, 68-84.

Dittmar, A., 2000, Why do firms repurchase stock?, *Journal of Business* 73, 331-355.

Dow, J. and G. Gorton, 1997, Noise trading, delegated portfolio management, and economic welfare, *Journal of Political Economy* 105, 1024-1050.

Easterbrook, F., 1984, Two agency-cost explanations of dividends, *American Economic Review*, 74, 650-659.

Edelen, R. M., 1999, Investor flows and the assessed performance of open-end mutual funds, *Journal of Financial Economics* 5, 439-466.

Elyasiani, E., J. Jia and C. Mao, 2006, Institutional ownership stability and the cost of debt, mimeo.

Fama, E. and K. R. French, 1992, The Cross-section of Expected Stock Returns, *Journal of Finance* 47(2), 427-465.

Fama, E. and K. R. French, 2001, Disappearing Dividends: changing firm characteristics or lower propensity to pay?, *Journal of Financial Economics* 60, 3-43.

Fenn G. W. and N. Liang, 2001, Corporate payout policy and managerial stock incentives, *Journal of Financial Economics* 60, 45-72.

Fluck, Z., 1999, The dynamics of the manager-shareholder conflict, *Review of Financial Studies*, 12, 379-404.

Froot, K., A. Perold, and J. Stein, 1992, Shareholder Trading Practices and Corporate Investment Horizons, *Journal of Applied Corporate Finance* 5, 42-58.

Gaspar, J.-M., M. Massa, and P. Matos, 2005, Shareholder Investment Horizons and the Market for Corporate Control, *Journal of Financial Economics* 76 (1), pp. 135-165.

Gillan S. and L. Starks, 2007, The Evolution of Shareholder Activism in the United States, *Journal of Applied Corporate Finance* 19, 55-73.

Ginglinger, E., and J. Hamon, 2007, Actual share repurchases, timing and liquidity. *Journal of Banking and Finance* 31, 915-938.

Goldman E. and S. Slezak, 2003, Delegated portfolio management and rational prolonged mispricing, Journal of Finance 58, 283-311.

Gompers, P., and A. Metrick, 2001, Institutional investors and equity prices, *Quarterly Journal of Economics* 116 (1), 229-259.

Gompers, P., J. Ishii, and A. Metrick, 2003, Corporate Governance and Equity Prices, *The Quarterly Journal of Economics* 118(1), February 2003, 107-155.

Grinstein, Y. and R. Michaely, 2005, Institutional Holdings and Payout Policy, *Journal of Finance* 60, 1389-1426.

Green, R., B. Hollifield, 2003, The personal-tax advantages of equity, *Journal of Financial Economics* 67, 175–216.

Greene, W. H., 2003, *Econometric analysis*, Prentice-Hall: New Jersey.

Grullon, G., and D. Ikenberry, 2000, What do we know about stock repurchases? *Journal of Applied Corporate Finance* 13, 31-51.

Grullon, G., and R. Michaely, 2002, Dividends, Share Repurchases, and the Substitution Hypothesis, *Journal of Finance* 57, 1649-1684.

Grullon, G., R. Michaely and B. Swaminathan, 2002, Are Dividend Changes a Sign of Firm Maturity?, *Journal of Business* 75, 387-424.

Guay, W. and J. Harford, 2000, The Cash-Flow Permanence and Information Content of Dividend Increases Versus Repurchases, *Journal of Financial Economics* 57, 385-415.

Heckman, J. 1979, Sample selection bias as a specification error, *Econometrica* 47, 153–161.

Holden, C. H. and A. Subrahmanyam, 1996, Risk Aversion, Liquidity, and Endogenous Short Horizons, *Review of Financial Studies* 9, 691–722.

Holtz-Eakin, D., W. Newey, and H. S. Rosen, 1988, Estimating vector autoregressions with panel data, *Econometrica* 56, 1371–1395.

Hotchkiss, E., and S. Lawrence, 2003, Empirical evidence on the existence of dividend clienteles, mimeo, Boston College.

Hotchkiss, E., and D. Strickland, 2003, Does shareholder composition matter? Evidence from the market reaction to corporate earnings announcements, *Journal of Finance* 58, 1469-1498.

Hovakimian, A. and G. Li, 2010, Shareholder Investment Horizons and Payout Policy, mimeo.

Ikenberry, D., J. Lakonishok and T. Vermaelen, 1995, Market Underreaction to Open Market Share Repurchases, *Journal of Financial Economics* 39, 181-208.

Jaganathan, M., C. Stephens, and M. Weisbach, 2000, Financial Flexibility and the Choice Between Dividends and Stock Repurchases, *Journal of Financial Economics* 57, 355-384.

Jensen, M., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–329.

Jin L., 2006, Capital gains tax overhang and price pressure, *Journal of Finance* 61, 1399-1429.

John, K. and A. Knyazeva, 2006, Payout policy, agency conflicts and corporate governance, New York University working paper.

Julio, B. and D. Ikenberry, 2004, Reappearing dividends, *Journal of Applied Corporate Finance* 16, 89-100.

Kahle, K., 2002, When a Buyback Isn't a Buyback: Open Market Repurchases and Employee Stock Options, *Journal of Financial Economics* 63, 235-261.

Lintner, J., 1956, Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes, *American Economic Review*, 46, 97-113.

Liu, Y. and Y. Peng, 2006, Institutional ownership composition and accruals quality, mimeo.

Lucas, D. and R. McDonald, 1998, Shareholder Heterogeneity, Adverse Selection, and Payout Policy, *Journal of Financial and Quantitative Analysis* 33(2), 233-253.

Miller, J., and J. McConnell, 1995, Open-market share repurchase programs and bid–ask spreads on the NYSE: implications for corporate payout policy. *Journal of Financial and Quantitative Analysis* 30, 365–382.

Miller, M. and F. Modigliani, 1961, Dividend Policy, Growth and the Valuation of Shares, *Journal of Business* 34, 1031-1051.

Nohel, T. and V. Tarhan, 1998, Share repurchases and firm performance: new evidence on the agency costs of free cash flow, *Journal of Financial Economics* 49(2) 187-222.

Ofer, A. and A. Thakor, 1987, A theory of stock price responses to alternative corporate cash disbursement methods: stock repurchases and dividends, *Journal of Finance* 42, 365-394.

Porter, M., 1992, Capital disadvantage: America's falling capital investment system, *Harvard Business Review*, September-October, 65-83.

Poterba, J.,1987, Tax policy and corporate savings, *Brookings Papers on Economic Activity* 1987, 455–515.

Scharfstein, D. and J. Stein, 1990, Herd behavior and investment, *American Economic Review* 80 (3), 465-479.

Shin, J., 2008, Institutional investment horizons and CEO compensation, mimeo.

Shleifer, A., and R. Vishny, 1986, Large shareholders and corporate control, *Journal of Political Economy* 94(3), 461-488.

Shleifer, A. and R. Vishny, 1997, The Limits to Arbitrage, *Journal of Finance* 52, 35-55.

Stein, J., 1989, Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior, *Quarterly Journal of Economics* 104, 655-669.

Stephens, C. and M. Weisbach, 1998, Actual share reacquisitions in open-market repurchase programs, *Journal of Finance* 53, 313-333.

Strickland, D., 1997, Determinants of institutional ownership: Implications for dividend clienteles, working paper, Ohio State University.

Yan, X. and Z. Zhang, 2009, Institutional investors and equity returns: are short-term institutions better informed?, *Review of Financial Studies* 22, 893-924.

Zwiebel, J., 1996, Dynamic capital structure under managerial entrenchment, *American Economic Review* 86, 1197-1215.

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Table 1
Summary Statistics

This table presents summary statistics for the sample used in this study. Our main data source is the CRSP-COMPUSTAT Merged database of firm-level annual data on dollar payouts for US listed firms reporting positive payouts during the period 1984-2008. We exclude regulated utilities, financial firms, and firms which have a share code in CRSP different from 10 or 11. We take all open market repurchase program announcements from the Securities Data Corporation (SDC) database and collect the dollar value of repurchases from COMPUSTAT for only those years in which there was an announcement in SDC in that year or in one of the previous two years (Jagannathan et al., 2000). We exclude the year 1987 for firm year observations and the last quarter of 1987 for announcement data (e.g. Ikenberry, Lakonishok and Vermaelen, 1995; Grullon and Michaely, 2002). We obtain from the CRSP Monthly Stocks event file all declaration events with codes equal to 1232 (ordinary quarterly dividends) with non-missing declaration dates. Following Amihud and Li (2006) we take only those dividend increases where the change in the dividend per share amount is at least 0.5%. Panel A presents the summary statistics data for our firm-level panel. Panel B shows the summary statistics around announcements of payout changes (repurchases and dividend increases). Variable definitions and sources are provided in Appendix A. The symbols ***,**,* denote significance levels of 1%, 5% and 10%, respectively, for the t-test (rank sum test) that the means (medians) are equal across the two sub-samples.

Table 1 (cont.)
Summary Statistics

Panel A: Summary statistics, firm-year observations

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Repurchases Amount	25,197	54.516	259.625	0	0.019	9.796
Dividend Amount	25,197	41.645	145.232	0.351	5.145	25.258
Total Payout	25,197	96.161	332.224	3.034	11.848	52.911
Dividend Increase	25,197	6.002	56.546	0	0.100	1.606
Share of Repurchases in Total Payout	25,197	0.356	0.437	0	0	0.906
Share of Rep. in Payout Increasing Firms	22,495	0.483	0.483	0	0.384	1.000
Investor Turnover	25,197	0.221	0.076	0.168	0.208	0.257
Institutional Ownership (I.O.)	25,197	0.514	0.236	0.335	0.522	0.690
I.O. of High Turnover Investors	25,197	0.093	0.074	0.041	0.076	0.126
I.O. of Medium Turnover Investors	25,197	0.161	0.103	0.083	0.149	0.224
I.O. of Low Turnover Investors	25,197	0.230	0.150	0.111	0.209	0.329
Size	25,197	6.206	1.641	4.989	6.129	7.383
Market-to-Book Ratio	25,197	3.023	3.981	1.478	2.156	3.287
Debt-to-Equity Ratio	25,197	0.603	1.853	0.068	0.318	0.678
Operating Income	25,197	0.161	0.091	0.114	0.156	0.204
Non-Operating Income	25,197	0.010	0.014	0.002	0.007	0.016
Std. Dev. Of Operating Income	25,197	0.040	0.042	0.017	0.029	0.049
Liquid Assets	25,197	0.266	0.197	0.114	0.249	0.396
Prior Payout Ratio	25,197	0.165	1.604	0.000	0.168	0.383
Last 12 Months' Return	25,197	0.168	0.533	-0.118	0.098	0.352
Last 12 Months' Share Turnover	25,197	1.262	1.403	0.475	0.828	1.534
Illiquidity	25,197	0.287	1.216	0.002	0.016	0.118
Number of Analysts	25,197	8.614	7.577	3.000	6.000	12.000
Managerial Holdings	11,597	0.042	0.091	0.002	0.008	0.032
Managerial Stock Options	10,008	0.280	0.214	0.111	0.253	0.420
GIM Governance Index	12,921	9.403	2.756	7.000	9.000	11.000

Table 1 (cont.)
Summary Statistics

Panel B: Summary statistics for firms announcing payout changes

Variable	All event firms						Repurchasing firms			Dividend-increasing firms		
	N	Mean	Std. Dev.	Q1	Median	Q3	N	Mean	Median	N	Mean	Median
Investor Turnover	17,604	0.216	0.071	0.167	0.205	0.250	8,104	0.224	0.211	9,500	0.208 ***	0.200 ***
Institutional Ownership (I.O.)	17,604	0.544	0.224	0.384	0.554	0.706	8,104	0.573	0.590	9,500	0.519 ***	0.529 ***
I.O. of High Turnover Investors	17,604	0.094	0.072	0.044	0.078	0.126	8,104	0.105	0.088	9,500	0.085 ***	0.071 ***
I.O. of Medium Turnover Investors	17,604	0.166	0.097	0.096	0.155	0.224	8,104	0.175	0.166	9,500	0.158 ***	0.148 ***
I.O. of Low Turnover Investors	17,604	0.252	0.150	0.137	0.236	0.352	8,104	0.262	0.246	9,500	0.244 ***	0.228 ***
Size	17,604	6.451	1.643	5.249	6.415	7.663	8,104	6.242	6.156	9,500	6.629 ***	6.580 ***
Market-to-Book Ratio	17,604	3.244	3.642	1.686	2.420	3.613	8,104	3.557	2.531	9,500	2.978 ***	2.337 ***
Debt-to-Equity Ratio	17,604	0.521	1.777	0.060	0.282	0.590	8,104	0.564	0.227	9,500	0.485 ***	0.316 ***
Operating Income	17,604	0.175	0.090	0.128	0.170	0.217	8,104	0.160	0.158	9,500	0.187 ***	0.178 ***
Non-Operating Income	17,604	0.010	0.013	0.002	0.007	0.015	8,104	0.010	0.007	9,500	0.010	0.007
Std. Dev. Of Operating Income	17,604	0.036	0.039	0.015	0.026	0.044	8,104	0.044	0.031	9,500	0.030 ***	0.023 ***
Liquid Assets	17,604	0.264	0.194	0.117	0.247	0.389	8,104	0.288	0.267	9,500	0.244 ***	0.232 ***
Prior Payout Ratio	17,604	0.186	1.534	0.000	0.204	0.379	8,104	0.097	0.000	9,500	0.262 ***	0.285 ***
Last 12 Months' Return	17,604	0.230	0.522	-0.046	0.155	0.401	8,104	0.213	0.119	9,500	0.243 ***	0.179 ***
Last 12 Months' Share Turnover	17,604	1.289	1.353	0.489	0.849	1.579	8,104	1.725	1.197	9,500	0.918 ***	0.664 ***
Illiquidity	17,604	0.163	0.779	0.001	0.008	0.058	8,104	0.204	0.007	9,500	0.128 ***	0.009 ***
Number of Analysts	17,604	9.960	8.116	4.000	8.000	14.000	8,104	9.154	7.000	9,500	10.648 ***	9.000 ***
Managerial Holdings	8,860	0.039	0.086	0.002	0.007	0.029	4,574	0.038	0.007	4,286	0.039	0.007
Managerial Stock Options	7,493	0.282	0.213	0.118	0.254	0.420	3,789	0.313	0.288	3,704	0.251 ***	0.227 ***
GIM Governance Index	9,739	9.480	2.759	8.000	10.000	12.000	4,663	9.143	9.000	5,076	9.791 ***	10.000 ***
Cumulative Abnormal Return (-1,+1)	17,604	0.011	0.064	-0.015	0.007	0.035	8,104	0.020	0.015	9,500	0.003 ***	0.002 ***
Size of Repurchase	8,075	0.068	0.080	0.026	0.050	0.089	8,075	0.068	0.050			

Table 2. Shareholder Investment Horizons and the Share of Repurchases in Payout

This table presents Tobit regression results of the relation between the share of payout in the form of repurchases and investor turnover. Our sample is composed of firms reporting positive payouts. In Panel A the dependent variable is the Share of Repurchases to Total Payout, the ratio of dollar repurchases to Total Payout (dividends plus repurchases). In Panel B the dependent variable is the Share of Repurchase in Payout-Increasing Firms, the ratio between Repurchases Amount and the sum (Repurchases Amount + Dividend Increase). Dividend Increase is the dollar positive change in dollar dividends. Please refer to Appendix A for definitions and details on the construction of all variables. Column 1 presents our basic specification and column 2 shows our extended specification with executive compensation and governance data. Columns 3 and 4 repeat the analysis using as main independent variable the lagged fraction of a firm's shares held by investors in the top (middle/bottom) 33rd percentile of institutional investor's turnover rates. Columns 5 and 6 present results of interacting Investor Turnover with firms with High Analysts' Forecast Errors and High Dispersion of Opinion, respectively. Analyst Forecast Error (AFE) is the yearly average of the monthly (actual EPS – average forecast EPS) / average forecast EPS. Dispersion of Opinion (DOP) is the ratio between the standard deviation of analysts' EPS forecasts and the absolute value of the average EPS forecast. We define indicator variables called High AFE (High DOP) that take the value of 1 if the firm's AFE (DOP) is above the sample median in a given year, and 0 otherwise. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A: Dependent variable is Share of Repurchases in Total Payout												
	(1)		(2)		(3)		(4)		(5)		(6)	
Investor Turnover	1.265	***	1.177	***					1.415	***	1.526	***
	(6.28)		(3.46)						(-6.86)		(-6.99)	
IO of High Turnover Investors					1.068	***	0.639	**				
					(4.33)		(2.27)					
IO of Mid Turnover Investors					0.167		0.043					
					(0.91)		(0.20)					
IO of Low Turnover Investors					-0.366	**	-0.284					
					(-2.12)		(-1.38)					
Institutional Ownership (IO)	0.187		0.061						0.184		0.089	
	(1.35)		(0.37)						(-1.32)		(-0.76)	
Size	-0.200	***	-0.053	*	-0.186	***	-0.048		-0.187	***	-0.164	***
	(-8.45)		(-1.76)		(-7.87)		(-1.57)		(-7.96)		(-7.19)	
Market-to-Book Ratio	0.003		-0.005		0.004		-0.005		0.002		0.003	
	(0.56)		(-0.82)		(0.76)		(-0.81)		(-0.45)		(-0.50)	
Debt-to-Equity Ratio	0.012		-0.006		0.01		-0.005		0.013		0.007	
	(1.17)		(-0.33)		(0.98)		(-0.27)		(-1.23)		(-0.69)	
Operating Income	-1.464	***	0.332		-1.428	***	0.361		-1.388	***	-1.262	***
	(-5.18)		(0.94)		(-5.08)		(1.02)		(-4.84)		(-4.65)	
Non-Operating Income	2.237		2.491		2.116		2.391		1.861		2.057	
	(1.60)		(1.40)		(1.52)		(1.34)		(-1.34)		(-1.50)	
Std. Dev. Of Op. Income	2.524	***	1.645	**	2.478	***	1.632	**	2.478	***	1.786	***
	(3.69)		(2.24)		(3.64)		(2.21)		(-3.58)		(-3.14)	
Liquid Assets	0.36	**	0.348	*	0.363	**	0.351	*	0.345	**	0.364	**
	(2.43)		(1.87)		(2.45)		(1.89)		(-2.35)		(-2.48)	
Prior Payout Ratio	-0.018		-0.002		-0.017		-0.002		-0.016		-0.012	
	(-1.62)		(-0.37)		(-1.60)		(-0.31)		(-1.55)		(-1.38)	
Last 12 Mths. Return	-0.131	***	-0.015		-0.134	***	-0.017		-0.146	***	-0.121	***
	(-5.91)		(-0.44)		(-6.02)		(-0.49)		(-6.63)		(-5.31)	
Last 12 Mths. Share Turnover	0.189	***	0.198	***	0.191	***	0.2	***	0.189	***	0.231	***
	(4.17)		(7.99)		(4.19)		(8.02)		(-4.07)		(-11.77)	
Illiquidity	0.01		-0.012		0.013		-0.018		0.013		0.038	
	(0.67)		(-0.21)		(0.85)		(-0.33)		(-0.73)		(-1.48)	
Number of Analysts	0.03	***	0.012	***	0.03	***	0.012	***	0.029	***	0.025	***
	(7.32)		(2.69)		(7.34)		(2.71)		(-7.19)		(-6.53)	
Managerial Holdings			-0.454	*			-0.485	*				
			(-1.75)				(-1.86)					
Managerial Stock Options			0.669	***			0.67	***				
			(6.88)				(6.90)					
GIM Governance Index			-0.037	***			-0.037	***				
			(-3.93)				(-3.90)					
Inv. Turnover x AFE									0.185	*		
									(1.73)			
Analysts' Forecast Errors (AFE)									0.007			
									(1.02)			
Inv. Turnover x DOP											0.219	**
											(1.98)	
Dispersion of Opinion (DOP)											0.023	*
											(1.70)	
Intercept	1.401	***	0.562	*	1.669	***	0.82	***	1.294	***	1.123	***
	(6.21)		(1.75)		(7.45)		(2.62)		(-5.78)		(-5.01)	
Industry and time dummies	Yes		Yes		Yes		Yes		Yes		Yes	
N	25,197		8,777		25,197		8,777		24,524		21,391	
R-squared	0.18		0.14		0.18		0.14		0.18		0.19	

Panel B: Dependent variable is Share of Repurchases in Payout-Increasing Firms						
	(1)	(2)	(3)	(4)	(5)	(6)
Investor Turnover	1.896 ***	1.767 ***			1.461 ***	1.538 ***
	(6.28)	(3.34)			(4.76)	(4.71)
IO of High Turnover Investors			1.421 ***	0.686 *		
			(4.00)	(1.91)		
IO of Mid Turnover Investors			0.13	-0.055		
			(0.49)	(-0.17)		
IO of Low Turnover Investors			-0.446 *	-0.685 **		
			(-1.77)	(-2.21)		
Institutional Ownership (IO)	0.208	-0.13			0.247	0.142
	(1.05)	(-0.54)			(1.25)	(0.83)
Size	-0.17 ***	0.003	-0.157 ***	0.012	-0.162 ***	-0.14 ***
	(-5.14)	(0.07)	(-4.72)	(0.28)	(-4.89)	(-4.32)
Market-to-Book Ratio	0.004	-0.004	0.005	-0.004	0.005	0.004
	(0.53)	(-0.43)	(0.67)	(-0.41)	(0.60)	(0.47)
Debt-to-Equity Ratio	0.009	-0.025	0.007	-0.024	0.008	0.005
	(0.64)	(-0.87)	(0.50)	(-0.82)	(0.53)	(0.31)
Operating Income	-2.145 ***	0.504	-2.104 ***	0.551	-1.907 ***	-1.609 ***
	(-5.44)	(0.98)	(-5.35)	(1.07)	(-4.85)	(-3.94)
Non-Operating Income	3.472 *	3.272	3.325 *	3.125	3.471 *	4.394 **
	(1.75)	(1.27)	(1.67)	(1.21)	(1.73)	(2.09)
Std. Dev. Of Op. Income	4.988 ***	4.738 ***	4.929 ***	4.729 ***	4.687 ***	3.601 ***
	(5.05)	(3.84)	(4.99)	(3.83)	(4.83)	(3.85)
Liquid Assets	0.535 **	0.535 *	0.537 **	0.546 **	0.55 ***	0.567 ***
	(2.52)	(1.93)	(2.53)	(1.97)	(2.59)	(2.65)
Prior Payout Ratio	-0.014	0.004	-0.013	0.004	-0.013	-0.007
	(-1.05)	(0.41)	(-1.02)	(0.46)	(-1.01)	(-0.66)
Last 12 Mths. Return	-0.395 ***	-0.271 ***	-0.396 ***	-0.274 ***	-0.386 ***	-0.362 ***
	(-10.37)	(-5.66)	(-10.32)	(-5.70)	(-10.22)	(-9.39)
Last 12 Mths. Share Turnover	0.249 ***	0.281 ***	0.252 ***	0.284 ***	0.248 ***	0.303 ***
	(3.86)	(7.95)	(3.89)	(7.99)	(3.83)	(10.55)
Illiquidity	0.034	-0.063	0.038 *	-0.071	0.049 **	0.071 *
	(1.53)	(-0.85)	(1.69)	(-0.97)	(1.98)	(1.87)
Number of Analysts	0.028 ***	0.007	0.028 ***	0.007	0.028 ***	0.024 ***
	(4.82)	(1.05)	(4.84)	(1.07)	(4.88)	(4.42)
Managerial Holdings		-0.881 **		-0.933 **		
		(-2.29)		(-2.41)		
Managerial Stock Options		0.757 ***		0.753 ***		
		(5.24)		(5.22)		
GIM Governance Index		-0.044 ***		-0.043 ***		
		(-3.21)		(-3.18)		
Inv. Turnover x AFE					0.562 ***	
					(3.48)	
Analysts' Forecast Errors (AFE)					0.008	
					(0.80)	
Inv. Turnover x DOP						0.46 ***
						(2.70)
Dispersion of Opinion (DOP)						0.063 **
						(2.19)
Intercept	1.812 ***	0.518	2.204 ***	0.892 **	1.724 ***	1.49 ***
	(5.76)	(1.16)	(7.08)	(2.05)	(5.46)	(4.69)
Industry and time dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	22,495	7,942	22,495	7,942	22,350	19,659
R-squared	0.17	0.12	0.16	0.12	0.16	0.17

Table 3. Shareholder Investment Horizons and the Likelihood of a Repurchase

This table presents Probit regression results of the relation between the likelihood of a repurchase and investor turnover. The dependent variable takes a value of 1 if a firm makes an open market share repurchase announcement and a value of 0 for a dividend increase announcement. Please refer to Appendix A for definitions and details on the construction of all variables. Column 1 (2) presents our basic (extended) specification. Columns 3 and 4 repeat the analysis using as main independent variable the lagged fraction of a firm's shares held by investors in the top (middle/bottom) 33rd percentile of institutional investor's turnover rates. Columns 5 and 6 present results of interacting Investor Turnover with firms with High Analysts' Forecast Errors and High Dispersion of Opinion, respectively. Analyst Forecast Error (AFE) is the yearly average of the monthly (actual EPS – average forecast EPS) / average forecast EPS. Dispersion of Opinion (DOP) is the ratio between the standard deviation of analysts' EPS forecasts and the absolute value of the average EPS forecast. We define indicator variables called High AFE (High DOP) that take the value of 1 if the firm's AFE (DOP) is above the sample median in a given year, and 0 otherwise. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Dependent Variable: Dummy equal to 1 for a Repurchase announcement and equal to 0 for a Dividend increase announcement						
	(1)	(2)	(3)	(4)	(5)	(6)
Investor Turnover	1.122 ***	1.186 ***			1.041 ***	1.328 ***
	(5.34)	(2.63)			(4.53)	(5.22)
IO of High Turnover Investors			1.107 ***	1.08 ***		
			(5.45)	(3.06)		
IO of Mid Turnover Investors			0.249	0.356		
			(1.52)	(1.44)		
IO of Low Turnover Investors			-0.403 **	-0.236		
			(-2.48)	(-1.02)		
Institutional Ownership (IO)	0.178	0.27			0.222 **	0.255 **
	(1.61)	(1.61)			(2.01)	(2.21)
Size	-0.166 ***	-0.076 **	-0.151 ***	-0.063 *	-0.157 ***	-0.145 ***
	(-7.51)	(-2.10)	(-6.76)	(-1.74)	(-7.08)	(-6.23)
Market-to-Book Ratio	0.012 *	-0.001	0.012 *	0.000	0.013 **	0.012 **
	(1.93)	(-0.06)	(1.93)	(-0.01)	(2.02)	(1.97)
Debt-to-Equity Ratio	0.012	0.074 *	0.01	0.072 **	0.01	0.008
	(1.08)	(1.96)	(0.95)	(1.97)	(0.97)	(0.75)
Operating Income	-2.866 ***	-1.353 ***	-2.774 ***	-1.269 ***	-2.729 ***	-2.544 ***
	(-11.58)	(-3.13)	(-11.26)	(-2.94)	(-10.78)	(-9.76)
Non-Operating Income	0.146	3.292	0.104	3.208	0.112	0.746
	(0.11)	(1.43)	(0.08)	(1.39)	(0.09)	(0.53)
Std. Dev. Of Op. Income	3.831 ***	4.608 ***	3.754 ***	4.589 ***	3.683 ***	3.814 ***
	(5.29)	(4.47)	(5.15)	(4.45)	(5.10)	(5.96)
Liquid Assets	-0.011	-0.029	-0.002	-0.017	-0.006	0.039
	(-0.07)	(-0.14)	(-0.01)	(-0.08)	(-0.04)	(0.24)
Prior Payout Ratio	-0.015	-0.003	-0.014	-0.002	-0.013	-0.011
	(-1.57)	(-0.75)	(-1.49)	(-0.56)	(-1.57)	(-1.47)
Last 12 Mths. Return	-0.21 ***	-0.135 ***	-0.216 ***	-0.142 ***	-0.221 ***	-0.211 ***
	(-9.27)	(-3.12)	(-9.58)	(-3.27)	(-9.63)	(-8.53)
Last 12 Mths. Share Turnover	0.216 ***	0.221 ***	0.215 ***	0.22 ***	0.215 ***	0.199 ***
	(9.88)	(7.32)	(9.75)	(7.22)	(9.78)	(8.84)
Illiquidity	0.04	-0.014	0.045	-0.028	0.077 ***	0.106 ***
	(1.49)	(-0.03)	(1.56)	(-0.07)	(3.29)	(3.17)
Number of Analysts	0.015 ***	0.005	0.016 ***	0.005	0.015 ***	0.013 ***
	(4.66)	(1.04)	(4.73)	(1.10)	(4.64)	(3.88)
Managerial Holdings		-0.344		-0.398		
		(-1.25)		(-1.46)		
Managerial Stock Options		0.472 ***		0.464 ***		
		(4.26)		(4.17)		
GIM Governance Index		-0.028 ***		-0.027 ***		
		(-2.93)		(-2.91)		
Inv. Turnover x AFE					0.405 ***	
					(3.52)	
Analysts' Forecast Errors (AFE)					0.028	
					(1.28)	
Inv. Turnover x DOP						0.539 ***
						(4.63)
Dispersion of Opinion (DOP)						0.032
						(1.07)
Intercept	1.225 ***	0.685 **	1.43 ***	0.92 ***	1.111 ***	0.939 ***
	(5.91)	(2.00)	(7.08)	(2.76)	(5.35)	(4.25)
Industry and time dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	17,604	6,711	17,604	6,711	17,417	15,863
R-squared	0.23	0.12	0.23	0.12	0.23	0.22

Table 4. Shareholder Investment Horizons and the Market Reaction to Repurchase Announcements

This table presents regression results of the relation between the stock market's reaction to a repurchase announcement and investor turnover. The dependent variable is the Cumulative Abnormal Return (CAR) for the daily window (-1, +1) is measured against the CRSP value-weighted index. Please refer to Appendix A for definitions and details on the construction of all variables. Column 1 (2) presents our basic (extended) specification. Columns 3 and 4 repeat the analysis using as main independent variable the lagged fraction of a firm's shares held by investors in the top (middle/bottom) 33rd percentile of institutional investor's turnover rates. Columns 5 and 6 present results of interacting Investor Turnover with firms with High Analysts' Forecast Errors and High Dispersion of Opinion, respectively. Analyst Forecast Error (AFE) is the yearly average of the monthly (actual EPS – average forecast EPS) / average forecast EPS. Dispersion of Opinion (DOP) is the ratio between the standard deviation of analysts' EPS forecasts and the absolute value of the average EPS forecast. We define indicator variables called High AFE (High DOP) that take the value of 1 if the firm's AFE (DOP) is above the sample median in a given year, and 0 otherwise. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Dependent Variable: Cumulative Abnormal Return with window (-1,+1) around Repurchase announcements						
	(1)	(2)	(3)	(4)	(5)	(6)
Investor Turnover	-0.037 **	-0.082 ***			-0.052 ***	-0.017 *
	(-2.29)	(-2.79)			(-3.15)	(-1.91)
IO of High Turnover Investors			-0.055 ***	-0.042 **		
			(-4.84)	(-2.36)		
IO of Mid Turnover Investors			-0.016 *	-0.006		
			(-1.68)	(-0.45)		
IO of Low Turnover Investors			-0.003	0.007		
			(-0.47)	(0.71)		
Size of Repurchase	0.038 ***	0.045 ***	0.034 ***	0.046 ***	0.037 ***	0.031 ***
	(3.36)	(2.94)	(3.58)	(3.10)	(3.28)	(2.67)
Institutional Ownership (IO)	-0.02 ***	-0.004			-0.019 ***	-0.017 ***
	(-3.31)	(-0.50)			(-3.14)	(-2.70)
Size	-0.003 ***	-0.001	-0.004 ***	-0.001	-0.003 ***	-0.003 **
	(-3.00)	(-0.84)	(-3.85)	(-0.88)	(-2.97)	(-2.22)
Market-to-Book Ratio	0.000	-0.001	0.000	-0.001	0.000	0.000
	(1.18)	(-1.07)	(0.90)	(-0.99)	(1.12)	(0.26)
Debt-to-Equity Ratio	-0.001	0.001 **	0	0.001 *	-0.001	-0.001 **
	(-1.31)	(2.18)	(0.18)	(1.90)	(-1.39)	(-1.97)
Operating Income	-0.024 *	0.002	-0.017	0.001	-0.018	-0.017
	(-1.67)	(0.08)	(-1.26)	(0.04)	(-1.26)	(-1.15)
Non-Operating Income	-0.061	-0.103	-0.12 **	-0.11	-0.053	0.003
	(-0.84)	(-1.02)	(-2.01)	(-1.11)	(-0.73)	(-0.03)
Std. Dev. Of Op. Income	0.044	0.056	0.05 *	0.052	0.041	0.05
	(1.55)	(1.29)	(1.95)	(1.20)	(1.39)	(1.61)
Liquid Assets	-0.016 **	-0.015	-0.016 **	-0.015	-0.017 **	-0.014 *
	(-2.22)	(-1.59)	(-2.53)	(-1.59)	(-2.26)	(-1.74)
Prior Payout Ratio	0.00	0.00 *	0.00	0.00	0.00	0.00 *
	(0.64)	(1.72)	(0.82)	(1.23)	(0.65)	(1.92)
Last 12 Mths. Return	-0.009 ***	-0.004	-0.008 ***	-0.004	-0.009 ***	-0.009 ***
	(-4.46)	(-1.19)	(-4.26)	(-1.15)	(-4.44)	(-3.55)
Last 12 Mths. Share Turnover	0.002 **	0.001	0.001 **	0.001	0.002 **	0.002 **
	(2.42)	(1.44)	(2.08)	(1.42)	(2.32)	(2.03)
Illiquidity	0.003 **	0.104 ***	0.003 **	0.107 ***	0.002 **	0.005 *
	(2.23)	(3.06)	(2.29)	(3.17)	(2.07)	(1.65)
Number of Analysts	0.00	0.00	0.00	0.00	0.00	0.00
	(0.32)	(0.75)	(0.95)	(0.78)	(0.07)	(0.32)
Managerial Holdings		0.006		0.006		
		(0.45)		(0.44)		
Managerial Stock Options		-0.003		-0.002		
		(-0.55)		(-0.43)		
GIM Governance Index		0.00		0.00		
		(0.62)		(0.61)		
Inv. Turnover x AFE					0.021 **	
					(2.34)	
Analysts' Forecast Errors (AFE)					0.001	
					(0.49)	
Inv. Turnover x DOP						0.014 *
						(1.67)
Dispersion of Opinion (DOP)						0.001
						(0.85)
Intercept	0.056 ***	0.025	0.056 ***	0.005	0.055 ***	0.096 ***
	(4.87)	(1.53)	(5.54)	(0.37)	(4.68)	(3.02)
Industry and time dummies						
N	8,041	3,120	7,694	3,120	7,986	7,201
R-squared	0.03	0.03	0.04	0.02	0.03	0.02

Table 5. Shareholder Investment Horizons and the Level of Payout

This table presents regression results of the relation between the amount of both repurchases and dividends, and investor turnover. Our sample is composed of firms reporting positive payouts. In Column 1 through 3 the dependent variable is the Log of (1+Repurchases Amount). Column 1 (2) uses Investor Turnover as the main independent variable and our basic (extended) regression specification. Column 3 uses our extended specification and IO of High, Mid, and Low Investor Turnover as the main independent variables. This pattern is similar for columns 4 through 6, but using as dependent variable the logarithm of 1 + the annual dollar value of dividends. Please refer to Appendix A for definitions and details on the construction of all variables. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Investor Turnover and the Level of Payout						
Dependent Variable:	Log of (1 + Repurchase Amount)			Log of (1 + Dividend Amount)		
	(1)	(2)	(3)	(4)	(5)	(6)
Investor Turnover	0.316 **	1.054 **		-0.884 ***	-1.900 ***	
	(2.21)	(2.00)		(-7.82)	(-5.72)	
IO of High Turnover Investors			0.680 *			-1.768 ***
			(1.71)			(-6.39)
IO of Mid Turnover Investors			-0.504			-1.125 ***
			(-1.54)			(-5.11)
IO of Low Turnover Investors			0.041			0.504 **
			(0.12)			(2.20)
Institutional Ownership (IO)	0.256 **	0.020		-0.707 ***	-0.554 ***	
	(2.26)	(0.08)		(-6.70)	(-3.18)	
Size	0.352 ***	0.488 ***	0.485 ***	0.807 ***	0.954 ***	0.931 ***
	(14.51)	(9.38)	(9.29)	(40.83)	(27.10)	(26.56)
Market-to-Book Ratio	0.027 ***	0.005	0.004	0.034 ***	0.035 ***	0.034 ***
	(3.51)	(0.38)	(0.33)	(6.40)	(4.77)	(4.57)
Debt-to-Equity Ratio	-0.042 ***	-0.07 *	-0.068 *	-0.077 ***	-0.107 ***	-0.105 ***
	(-2.61)	(-1.83)	(-1.75)	(-5.20)	(-3.90)	(-3.89)
Operating Income	1.856 ***	4.453 ***	4.453 ***	2.497 ***	4.368 ***	4.253 ***
	(9.52)	(7.90)	(7.91)	(13.00)	(10.61)	(10.39)
Non-Operating Income	4.03 ***	9.103 ***	8.982 ***	5.591 ***	6.610 ***	6.671 ***
	(3.57)	(3.27)	(3.21)	(6.02)	(3.64)	(3.69)
Std. Dev. Of Op. Income	1.361 ***	1.869 *	1.870 *	0.641 *	-1.546 **	-1.461 *
	(4.01)	(1.86)	(1.87)	(1.82)	(-1.97)	(-1.89)
Liquid Assets	0.566 ***	0.837 ***	0.836 ***	0.276 **	0.428 **	0.413 **
	(4.41)	(2.94)	(2.94)	(2.45)	(2.02)	(1.98)
Prior Payout Ratio	-0.007	0.003	0.003	0.028 *	0.007	0.007
	(-0.62)	(0.26)	(0.30)	(1.78)	(0.95)	(0.92)
Last 12 Mths. Return	0.108 ***	0.222 ***	0.220 ***	0.114 ***	0.045	0.055 *
	(5.26)	(4.31)	(4.27)	(7.83)	(1.52)	(1.89)
Last 12 Mths. Share Turnover	0.105 ***	0.116 ***	0.12 ***	-0.195 ***	-0.246 ***	-0.24 ***
	(4.84)	(3.43)	(3.55)	(-6.54)	(-9.70)	(-9.57)
Illiquidity	0.048 ***	0.123 **	0.118 *	0.038 ***	0.061 **	0.066 ***
	(6.32)	(1.98)	(1.94)	(6.13)	(2.31)	(2.68)
Number of Analysts	0.03 ***	0.028 ***	0.028 ***	0.015 ***	-0.005	-0.006
	(6.28)	(3.31)	(3.28)	(4.02)	(-0.86)	(-1.03)
Managerial Holdings		-1.087 ***	-1.110 ***		-0.500	-0.443
		(-2.76)	(-2.82)		(-1.50)	(-1.35)
Managerial Stock Options		0.954 ***	0.97 ***		-0.839 ***	-0.822 ***
		(5.66)	(5.76)		(-7.40)	(-7.33)
GIM Governance Index		-0.041 ***	-0.041 ***		0.058 ***	0.058 ***
		(-2.79)	(-2.79)		(5.66)	(5.63)
Intercept	-2.004 ***	-4.651 ***	-4.353 ***	-2.786 ***	-3.274 ***	-3.391 ***
	(-9.09)	(-10.75)	(-10.59)	(-13.17)	(-9.31)	(-9.90)
Industry and time dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	25,197	8,777	8,777	25,197	8,777	8,777
R-squared	0.29	0.24	0.24	0.66	0.63	0.63

Table 6. Causality Analysis

This table presents dynamic panel estimates of the causal relation between the share of payout in the form of repurchases and investor turnover. We use the generalized-method-of-moments dynamic panel data estimator of Blundell and Bond (1998). Please refer to Appendix A for details on variable construction and Appendix B for details on the estimation procedure. In Panel A, column 1, the dependent variable, Share of Repurchases to Total Payout, is regressed on its lag and on lagged Investor Turnover. In Panel A, column 2, the dependent variable is Investor Turnover which is regressed on its lag and on lagged Share of Repurchases to Total Payout. All control variables of our basic specification (cf. Table 2) are used (parameter estimates not shown). Columns 3 and 4 are similar except that they use our extended specification. In Panel B Share of Repurchases in Payout-Increasing Firms is used as endogenous variable along with Investor Turnover. The table shows the p-value of the hypothesis test that the first-differenced residuals are autocorrelated of order 2, and the p-value of the Sargan test of the null hypothesis of validity of the over-identifying moment conditions. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A: Causality Analysis of Share of Repurchases in Total Payout and Investor Turnover

Specification:	Basic Set of Controls		Extended Set of Controls	
Dependent Variable:	Share of Repurchases in Total Payout	Investor Turnover	Share of Repurchases in Total Payout	Investor Turnover
	(1)	(2)	(3)	(4)
Lag Share of Repurchases in Total Payout	0.371***	0.003	0.533***	0.034
	(11.01)	(0.22)	(12.57)	(0.93)
Lag Investor Turnover	0.788**	0.119*	0.515**	0.019
	(2.08)	(1.83)	(1.99)	(0.29)
N	18,604	18,604	7,838	7,838
P-Value of AR(2) test	0.33	0.31	0.19	0.29
P-value of Sargan test	0.69	0.45	0.33	0.31

Panel B: Causality Analysis of Share of Repurchases in Payout Increasing Firms and Investor Turnover

Specification:	Basic Set of Controls		Extended Set of Controls	
Dependent Variable:	Share of Repurchases in Payout Increasing Firms	Investor Turnover	Share of Repurchases in Payout Increasing Firms	Investor Turnover
	(1)	(2)	(3)	(4)
Lag Share of Repurchases in Payout-Increasing Firms	0.460***	-0.001	0.495**	0.002
	(12.19)	(-0.13)	(8.25)	(0.13)
Lag Investor Turnover	1.063**	0.094*	0.278*	0.05
	(2.14)	(1.86)	(1.70)	(0.75)
N	15,377	15,377	6,612	6,612
P-Value of AR(2) test	0.27	0.23	0.35	0.34
P-value of Sargan test	0.65	0.60	0.25	0.35

Table 7. Estimates adjusting for Sample Selection

This table presents results of replicating the main results adjusting for sample selection. All specifications presented are the second stage of a two-stage Heckman (1979) sample-selection model. The first stage of the selection model is estimated in the universe of CRSP-COMPUSTAT firms for which data on our variables exists (the first stage estimation results are presented in Table 8). Columns 1 and 2 replicates the column 1 and 2 of Table 2. Columns 3 and 4 replicates the column 1 and 2 of Table 3. Columns 5 and 6 replicates the column 1 and 2 of Table 4. Please refer to Appendix A for definitions and details on the construction of all variables. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Estimation adjusting for Sample Selection												
Dependent Variable:	Share of Repurchases in Total Payout				Dummy equal to 1 for a Repurchase announcement				CAR with window (-1,+1) around Repurchase announcements			
	(1)		(2)		(3)		(4)		(3)		(4)	
Investor Turnover	0.710	**	0.149	*	1.718	***	1.335	***	-0.055	***	-0.107	***
	(2.63)		(1.88)		(3.69)		(3.64)		(-3.86)		(-4.64)	
Size of Repurchase									0.039	***	0.046	***
									(3.46)		(3.60)	
Institutional Ownership (IO)	0.112	***	0.047		0.231	***	0.977	*	-0.021	***	-0.001	
	(5.85)		(1.48)		(3.28)		(1.81)		(-3.97)		(-0.17)	
Size	0.026	***	0.067	***	0.191	***	-0.010		-0.001		0.000	
	(5.28)		(8.29)		(-5.62)		(-0.92)		(-0.98)		(-0.22)	
Market-to-Book Ratio	0.000		0.000		0.221		0.176		0.000		0.000	
	(0.19)		(0.29)		(-0.26)		(1.22)		(0.82)		(-0.71)	
Debt-to-Equity Ratio	-0.013	***	-0.016	***	0.501	*	0.142	***	-0.002	***	0.000	
	(-2.74)		(-2.82)		(-1.72)		(3.45)		(-3.20)		(0.10)	
Operating Income	0.557	***	0.996	***	-2.612	***	1.343		-0.020		0.004	
	(9.48)		(10.51)		(-8.18)		(-1.03)		(-1.35)		(0.23)	
Non-Operating Income	1.901	***	2.737	***	0.263		3.712		0.013		-0.075	
	(8.11)		(6.56)		(0.16)		(1.30)		(0.18)		(-0.87)	
Std. Dev. Of Op. Income	0.083		0.134		3.983	***	4.910	***	0.030		0.062	*
	(0.83)		(0.91)		(5.03)		(4.01)		(1.46)		(1.80)	
Liquid Assets	0.074	***	0.145	***	0.142		0.304		-0.013	**	-0.011	
	(4.53)		(4.56)		(-0.84)		(-0.59)		(-2.12)		(-1.45)	
Prior Payout Ratio	-0.005	***	-0.001		0.319		0.584		0.000		0.000	
	(-3.60)		(-0.30)		(-0.33)		(-1.04)		(-0.04)		(0.38)	
Last 12 Mths. Return	-0.022	***	0.006		0.200	***	0.172	***	-0.009	***	-0.003	
	(-5.54)		(0.75)		(-10.06)		(-3.54)		(-6.26)		(-1.61)	
Last 12 Mths. Share Turnover	0.042	***	0.048	***	0.545	***	0.415	***	0.002	***	0.001	*
	(22.66)		(14.90)		(-8.44)		(-7.21)		(2.98)		(1.80)	
Illiquidity	0.001		-0.018	***	0.589		0.059		0.003	***	0.135	***
	(0.73)		(-4.88)		(-0.59)		(0.67)		(3.57)		(6.36)	
Number of Analysts	0.004	***	0.002	*	0.333	***	0.083		0.000		0.000	
	(7.65)		(1.96)		(-4.87)		(-1.39)		(-0.37)		(0.88)	
Managerial Holdings			-0.160	***			0.078	*			0.013	
			(-3.44)				(1.67)				(1.02)	
Managerial Stock Options			0.198	***			0.554				-0.001	
			(9.40)				(-1.04)				(-0.22)	
GIM Governance Index			-0.006	***			0.251	***			0.000	
			(-3.69)				(-3.10)				(0.33)	
Heckman's Lambda	0.409	***	0.569	***	0.084	***	0.156	*	0.011	**	0.009	
	(3.89)		(6.70)		(3.06)		(1.95)		(2.31)		(0.01)	
Intercept	-0.368	***	-1.016	***	1.294	***	27.212	***	0.037		0.040	
	(-4.45)		(-4.82)		(-4.92)		(-3.47)		(0.43)			
Industry and time dummies	Yes		Yes		Yes		Yes		Yes		Yes	
N	25,169		8,774		17,580		6,701		9,270		3,421	
R-squared	0.33		0.27		0.23		0.12		0.03		0.04	

Table 8. Shareholder Investment Horizons and Likelihood of Payout among Non-Paying Firms

This table presents Probit regression results of the relation between the likelihood of a payout among non-paying firms and investor turnover. The relation is estimated in the universe of CRSP-COMPUSTAT firms for which data on our variables exists (and not only in the sample of firms reporting positive payouts as it is the case in the previous tables). To help identify the equations (necessary to estimate the second-stage regressions shown in Table 7), we add two variables to our basic specification. Sales Growth is the average of the past three years' percentage change in sales (COMPUSTAT item SALE). Log of Firm Age is the lagged natural logarithm of the time in years since the firm first enters the COMPUSTAT database. All other right-hand side variables are defined as in previous tables. Please refer to Appendix A for definitions and details on the construction of all variables. In Panel A, columns 1 and 2, the dependent variable takes a value of 1 if a firm makes an open market share repurchase announcement in a given year and 0 otherwise. In Panel A, columns 3 and 4, the dependent variable takes a value of 1 if a firm pays a dividend in a given year and 0 otherwise. In Panel A, columns 5 and 6, the dependent variable takes a value of 1 if a firm has a positive payout (that is, makes an open market share repurchase announcement or pays a dividend) in a given year and 0 otherwise. Panel B looks at payout initiation behavior. In columns 1 and 2, the dependent variable takes a value of 1 if a firm makes an open market share repurchase announcement for the first time during the sample period and 0 otherwise. In columns 3 and 4, the dependent variable takes a value of 1 if a firm pays a dividend for the first time during the sample period and 0 otherwise. To construct these initiation indicators we exclude the first year in which a firm first appears in the sample. Regressions include industry dummies and yearly dummies. Industries are defined using the Fama and French (1992) classification. We use standard errors clustered by firm to accommodate heteroscekedasticity and within-firm autocorrelation. T-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

Panel A: Investor Turnover and Likelihood of Payout

Dependent Variable:	Dummy equal to 1 if Firm Repurchases, 0 otherwise		Dummy equal to 1 if Firm pays Dividends, 0 otherwise		Dummy equal to 1 if a Firm has positive Payout, 0 otherwise	
	(1)	(2)	(3)	(4)	(5)	(6)
Investor Turnover	0.243 **		-0.990 ***		-0.384 ***	
	(2.03)		(-6.88)		(-3.24)	
IO of High Turnover Investors		0.149 *		-0.632 ***		-0.427 ***
		(1.86)		(-3.88)		(-3.58)
IO of Mid Turnover Investors		-0.031		-0.194		-0.198 *
		(-0.34)		(-1.41)		(-1.96)
IO of Low Turnover Investors		0.500 ***		0.815 ***		0.780 ***
		(5.62)		(5.58)		(7.29)
Institutional Ownership (IO)	0.250 ***		0.116		0.154 **	
	(4.46)		(1.15)		(2.24)	
Size	0.128 ***	0.123 ***	0.341 ***	0.326 ***	0.276 ***	0.264 ***
	(10.43)	(9.88)	(16.22)	(15.39)	(17.89)	(16.97)
Market-to-Book Ratio	0.001	0.000	0.011	0.010	0.014 ***	0.013 ***
	(0.29)	(0.08)	(1.63)	(1.51)	(3.69)	(3.43)
Debt-to-Equity Ratio	-0.023 **	-0.022 **	-0.102 ***	-0.100 ***	-0.062 ***	-0.060 ***
	(-2.48)	(-2.44)	(-4.96)	(-4.85)	(-4.56)	(-4.54)
Operating Income	2.179 ***	2.158 ***	4.783 ***	4.731 ***	3.233 ***	3.195 ***
	(20.20)	(20.07)	(17.43)	(17.24)	(21.43)	(21.25)
Non-Operating Income	5.302 ***	5.25 ***	3.861 ***	3.862 ***	5.452 ***	5.387 ***
	(8.66)	(8.57)	(3.86)	(3.86)	(7.97)	(7.91)
Std. Dev. Of Op. Income	-0.021	-0.019	-2.924 ***	-2.936 ***	-0.584 **	-0.580 **
	(-0.86)	(-0.79)	(-5.09)	(-5.09)	(-2.28)	(-2.29)
Liquid Assets	0.469 ***	0.467 ***	0.351 ***	0.352 ***	0.665 ***	0.660 ***
	(6.82)	(6.79)	(2.83)	(2.83)	(8.00)	(7.96)
Prior Payout Ratio	0.004	0.004	0.037 **	0.037 **	0.035 **	0.035 **
	(0.67)	(0.65)	(2.14)	(2.14)	(2.27)	(2.27)
Last 12 Mths. Return	-0.058 ***	-0.053 ***	0.089 ***	0.092 ***	0.003	0.009
	(-5.01)	(-4.61)	(7.34)	(7.59)	(0.29)	(0.85)
Last 12 Mths. Share Turnover	-0.031 ***	-0.029 ***	-0.25 ***	-0.252 ***	-0.118 ***	-0.117 ***
	(-4.66)	(-4.38)	(-9.73)	(-9.71)	(-9.30)	(-9.18)
Illiquidity	-0.013 ***	-0.015 ***	-0.024 ***	-0.027 ***	-0.027 ***	-0.030 ***
	(-2.91)	(-3.21)	(-2.70)	(-2.91)	(-5.02)	(-5.34)
Number of Analysts	0.007 ***	0.006 ***	-0.010 **	-0.010 **	-0.001	-0.001
	(2.76)	(2.65)	(-2.36)	(-2.35)	(-0.32)	(-0.46)
Sales growth	0.001 ***	0.001 ***	0.002 ***	0.002 ***	0.002 **	0.002 **
	(6.17)	(6.05)	(7.91)	(8.19)	(2.08)	(2.37)
Log of Firm age	0.091 ***	0.086 ***	0.493 ***	0.488 ***	0.366 ***	0.360 ***
	(6.54)	(6.18)	(20.91)	(20.63)	(21.39)	(21.06)
Intercept	-1.692 ***	-1.616 ***	-3.882 ***	-4.079 ***	-2.657 ***	-2.721 ***
	(-16.71)	(-16.73)	(-19.55)	(-20.71)	(-20.73)	(-21.74)
Industry and time dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	52,648	52,648	52,648	52,648	52,648	52,648
R-squared	0.13	0.13	0.45	0.45	0.31	0.31

Panel B: Investor Turnover and Likelihood of Payout Initiation								
Dependent Variable:	Dummy equal to 1 if Firm makes a Repurchase for the first time, 0 otherwise				Dummy equal to 1 if Firm pays a Dividend for the first time, 0 otherwise			
	(1)		(2)		(3)		(4)	
Investor Turnover	0.432	***			-0.041			
	(3.06)				(-0.18)			
IO of High Turnover Investors			0.577	***			0.346	
			(4.93)				(1.56)	
IO of Mid Turnover Investors			0.334	***			0.178	
			(3.35)				(1.03)	
IO of Low Turnover Investors			0.037				-0.154	
			(0.39)				(-0.89)	
Institutional Ownership (IO)	0.299	***			0.104			
	(6.32)				(1.18)			
Size	-0.011		-0.005		0.028		0.034	*
	(-1.07)		(-0.48)		(1.43)		(1.71)	
Market-to-Book Ratio	0.001		0.002		-0.002		-0.001	
	(0.44)		(0.56)		(-0.40)		(-0.30)	
Debt-to-Equity Ratio	-0.007		-0.007		-0.002		-0.003	
	(-1.28)		(-1.40)		(-0.32)		(-0.39)	
Operating Income	0.793	***	0.802	***	1.134	***	1.156	***
	(10.31)		(10.38)		(4.86)		(4.88)	
Non-Operating Income	1.471	***	1.456	**	1.872	*	1.853	*
	(2.59)		(2.56)		(1.72)		(1.75)	
Std. Dev. Of Op. Income	-0.061		-0.063		0.012		0.009	
	(-0.49)		(-0.50)		(0.53)		(0.39)	
Liquid Assets	0.324	***	0.33	***	0.187	*	0.191	*
	(5.88)		(5.98)		(1.83)		(1.88)	
Prior Payout Ratio	0.003		0.003		-0.008	**	-0.008	**
	(0.68)		(0.72)		(-2.35)		(-2.32)	
Last 12 Mths. Return	-0.014		-0.013		0.058	***	0.055	***
	(-0.96)		(-0.92)		(4.37)		(4.23)	
Last 12 Mths. Share Turnover	0.009	*	0.01	*	-0.005		-0.006	
	(1.79)		(1.89)		(-0.43)		(-0.54)	
Illiquidity	-0.022	***	-0.022	***	0.001		0.001	
	(-2.84)		(-2.85)		(0.13)		(0.27)	
Number of Analysts	0.011	***	0.011	***	-0.008	**	-0.008	*
	(5.60)		(5.75)		(-2.01)		(-1.87)	
Sales growth	0.001	***	0.001	***	0.001	***	0.001	***
	(10.31)		(10.31)		(12.70)		(12.70)	
Log of Firm age	-0.174	***	-0.172	***	-0.169	***	-0.164	***
	(-14.97)		(-14.71)		(-7.62)		(-7.44)	
Intercept	-1.476	***	-1.381	***	-2.509	***	-2.526	***
	(-15.76)		(-15.83)		(-13.71)		(-14.51)	
Industry and time dummies	Yes		Yes		Yes		Yes	
N	50,823		50,823		50,454		50,454	
R-squared	0.06		0.06		0.05		0.06	